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1989

FAA-T-8080-3C

**FUNDAMENTALS OF INSTRUCTING,
FLIGHT INSTRUCTOR,
GROUND INSTRUCTOR—
BASIC AND ADVANCED
QUESTION BOOK**



U.S. Department of Transportation
Federal Aviation Administration

Expires September 1, 1991

TD 4.32/21:



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GROUND INSTRUCTOR—BASIC AND ADVANCED**

QUESTION BOOK

1989

**U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Aviation Standards National Field Office**

PREFACE

This question book has been developed by the Federal Aviation Administration (FAA) for testing applicants in the following knowledge areas:

Flight Instructor—Airplane
Flight Instructor—Glider
Flight Instructor—Rotorcraft/Helicopter
Flight Instructor—Rotorcraft/Gyroplane
Flight Instructor Additional Rating—Airplane
Flight Instructor Additional Rating—Rotorcraft/Helicopter
Flight Instructor Additional Rating—Rotorcraft/Gyroplane
Fundamentals of Instructing
Basic Ground Instructor
Advanced Ground Instructor

This question book is issued as FAA-T-8080-3C, Fundamentals of Instructing, Flight Instructor, Ground Instructor—Basic and Advanced Question Book, and is available to the public from:

Superintendent Of Documents
U.S. Government Printing Office
Washington, DC 20402

or from U.S. Government Printing Office bookstores located in major cities throughout the United States. The questions included in this publication are predicated on regulations, principles, and practices that were valid at the time of publication. The question selection sheets prepared for use with this question book are security items and are revised at frequent intervals.

The FAA does not supply the correct answers to questions included in this book. Students should determine the answers by research and study, by working with instructors, or by attending ground schools. The FAA is NOT responsible for either the content of commercial reprints of this book or the accuracy of the answers they may list.

Comments regarding this publication should be directed to:

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Federal Aviation Administration
Aviation Standards National Field Office
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GENERAL INSTRUCTIONS

MAXIMUM TIME ALLOWED FOR TESTS:

Flight Instructor—Airplane, 6 Hours
Flight Instructor—Rotorcraft/Helicopter, 6 Hours
Flight Instructor Additional Rating—Airplane, 2 Hours
Flight Instructor Additional Rating—
Rotorcraft/Gyroplane, 2 Hours
Basic Ground Instructor, 6 Hours

Flight Instructor—Glider, 6 Hours
Flight Instructor—Rotorcraft/Gyroplane, 6 Hours
Flight Instructor—Additional Rating—
Rotorcraft/Helicopter, 2 Hours
Fundamentals of Instructing, 4 Hours
Advanced Ground Instructor, 6 Hours

1. Read the instructions on page 1 of AC Form 8080-3, Airman Written Test Application, and complete the form on page 4.
2. The question numbers in this question book are numbered consecutively beginning with No. 3001. Refer to the question selection sheet to determine which questions to answer.
3. For each item on the answer sheet, find the appropriate question in the book.
4. Mark your answer in the space provided for that item on the answer sheet.
5. The supplementary material required to answer the questions will be found in appendix 2.
6. Remember:
Read each question carefully and avoid hasty assumptions. Do not answer until you understand the question. Do not spend too much time on any one question. Answer all of the questions that you readily know and then reconsider those you find difficult. Be careful to make necessary conversions when working with temperatures, speeds, and distances.

if a regulation or operations procedure is changed after this question book is printed, you will receive credit until the affected questions are revised.

MATERIALS

Materials to be used with this question book when used for airman testing:

1. AC Form 8080-3 which includes the answer sheet.
2. Question selection sheet which identifies the questions to be answered.
3. Plastic overlay sheet which can be placed over performance charts for plotting purposes.

THE MINIMUM PASSING GRADE IS 70

WARNING

§ 61.37 Written tests: Cheating or other unauthorized conduct.

(a) Except as authorized by the Administrator, no person may--

(1) Copy, or intentionally remove, a written test under this part;

(2) Give to another, or receive from another, any part or copy of that test;

(3) Give help on that test to, or receive help on that test from, any person during the period that test is being given;

(4) Take any part of that test in behalf of another person;

(5) Use any material or aid during the period that test is being given; or

(6) Intentionally cause, assist, or participate in any act prohibited by this paragraph.

(b) No person whom the Administrator finds to have committed an act prohibited by paragraph (a) of this section is eligible for any airman or ground instructor certificate or rating, or to take any test therefore, under this chapter for a period of 1 year after the date of that act. In addition, the commission of that act is a basis for suspending or revoking any airman or ground instructor certificate or rating held by that person.

INTRODUCTION TO THE FUNDAMENTALS OF INSTRUCTING, FLIGHT INSTRUCTOR, GROUND INSTRUCTOR— BASIC AND ADVANCED QUESTION BOOK

This question book follows a new concept in knowledge testing that was established in 1982 with the publication of the Flight Instructor Question Book and the Fundamentals of Instructing and Ground Instructor Basic—Advanced Question Book. All the new question books are dated to indicate their expiration dates.

At an FAA testing center or an FAA designated written test examiner's facility, the applicant is issued a "clean copy" of this question book, an appropriate question selection sheet which indicates the specific questions to be answered, and AC Form 8080-3, Airman Written Test Application, which contains the answer sheet. The question book contains all the supplementary material required to answer the questions. This material will be found in appendix 2.

Questions and Scoring

The test questions are of the multiple-choice type. Answers to questions listed on the question selection sheet should be marked on the answer sheet of AC Form 8080-3. Directions should be read carefully before beginning the test. Incomplete or erroneous personal information entered on this form delays the scoring process. The answer sheet is sent to the Mike Monroney Aeronautical Center in Oklahoma City where it is scored by computer. The applicant will then be issued an AC Form 8080-2, Airman Written Test Report. This report must be presented for a flight test or for retesting in the event of written test failure. The applicant's AC Form 8080-2 will list the subject matter knowledge codes for the knowledge areas in which the applicant is found to be deficient. The written test subject matter knowledge codes, which list these knowledge areas by code, are located in this question book.

Taking the Test

The test may be taken at FAA testing centers, FAA written test examiners' facilities, or other designated places. After completing the test, the applicant must surrender the issued question book, question selection sheet, answer sheet, and any papers used for computations or notations, to the monitor before leaving the test room.

When taking the test, the applicant should keep the following points in mind:

1. Answer each question in accordance with the latest regulations and procedures.
2. Read each question carefully before looking at the possible answers. You should clearly understand the problem before attempting to solve it.
3. After formulating an answer, determine which of the alternatives most nearly corresponds with that answer. The answer chosen should completely resolve the problem.
4. From the answers given, it may appear that there is more than one possible answer; however, there is only one answer that is correct and complete. The other answers are either incomplete or are derived from popular misconceptions.
5. If a certain question is difficult for you, it is best to proceed to other questions. After the less difficult questions have been answered, return to those which gave you difficulty. Be sure to indicate on the question selection sheet the questions to which you wish to return.
6. When solving a computer problem, select the answer nearest your solution. The problem has been checked with various types of computers; therefore, if you have solved it correctly, your answer will be closer to the correct answer than to any of the other choices.
7. To aid in scoring, enter personal data in the appropriate spaces on the test answer sheet in a complete and legible manner. Enter the test number printed on the question selection sheet.

Retesting—FAR Section 61.49

Applicants who receive a failing grade may apply for retesting by presenting their AC Form 8080-2

1. after 30 days from the date the applicant failed the test; or
2. in case of the first failure, the applicant may apply for retesting before the 30 days have expired upon presenting a written statement from an authorized instructor certifying that the instructor has given ground instruction to the applicant and finds the applicant competent to pass the test.

QUESTIONS

3001. A change in behavior as a result of experience can be defined as

- 1—knowledge.
- 2—understanding.
- 3—learning.
- 4—motivation.

3002. The learning process may include such elements as verbal, conceptual, and

- 1—experiential.
- 2—problem solving.
- 3—habitual.
- 4—efficiency.

3003. While learning the material being taught, students may be learning other things as well. This additional learning is called

- 1—residual.
- 2—conceptual.
- 3—emotional.
- 4—incidental.

3004. Individuals learn best when they are willing to learn. This is a feature of the law of

- 1—primacy.
- 2—recency.
- 3—willingness.
- 4—readiness.

3005. The law of exercise is the basis of

- 1—insight and transfer.
- 2—understanding and application.
- 3—practice and drill.
- 4—correlation and performance.

3006. Teaching the student to perform a task right the first time is an example of the law of

- 1—readiness.
- 2—intensity.
- 3—effect.
- 4—primacy.

3007. The law that is based on the emotional reaction of the learner is the law of

- 1—effect.
- 2—intensity.
- 3—primacy.
- 4—recency.

3008. Which law of learning implies that a student will learn more from the real thing than from a substitute?

- 1—Law of intensity.
- 2—Law of primacy.
- 3—Law of exercise.
- 4—Law of effect.

3009. Which law of learning is recognized when an instructor carefully plans a summary for a ground school lesson or a postflight critique?

- 1—Law of recency.
- 2—Law of effect.
- 3—Law of exercise.
- 4—Law of intensity.

3010. Which law of learning states that learning is weakened when associated with an unpleasant feeling?

- 1—Law of effect.
- 2—Law of intensity.
- 3—Law of primacy.
- 4—Law of recency.

3011. Things most often repeated are best remembered because of which law of learning?

- 1—Law of recency.
- 2—Law of primacy.
- 3—Law of effect.
- 4—Law of exercise.

3012. When meaning is given to the input from the five senses this is called

- 1—understanding.
- 2—perception.
- 3—sensation.
- 4—inference.

3013. Which factor adversely affects students' perceptions by narrowing their perceptual field?

- 1—Physical organism.
- 2—Basic need.
- 3—Time.
- 4—Element of threat.

3014. Which statement is true concerning motivations?

- 1—Motivations may be very subtle and difficult to identify.
- 2—Motivations should be obvious to be useful.
- 3—Negative motivations often are as effective as positive motivations.
- 4—Motivations must be tangible to be effective.

3015. The mental grouping of affiliated perceptions is called

- 1—ideas.
- 2—association.
- 3—insights.
- 4—conceptualization.

3016. Motivations that cause a student to react with fear and anxiety are

- 1—positive.
- 2—tangible.
- 3—negative.
- 4—inverse.

3017. An instructor may foster the development of insights by

- 1—keeping the rate of learning consistent so that it is predictable.
- 2—introducing the student to at least two new tasks during each lesson.
- 3—helping the student acquire and maintain a favorable self-concept.
- 4—pointing out the attractive features of the activity to be learned.

3018. For a motivation to be effective, students must believe their efforts will be rewarded in a definite manner. This type of motivation is

- 1—tangible.
- 2—negative.
- 3—subtle.
- 4—insubstantial.

3019. Which of the following is generally the more effective way for the instructor to properly motivate students?

- 1—Reinforce their self-confidence by requiring no tasks beyond their ability to perform.
- 2—Appeal to their pride and self-esteem.
- 3—Maintain pleasant personal relationships with students.
- 4—Provide positive motivations by the promise or achievement of rewards.

3020. Motivations in the form of reproof and threats should be avoided with all but the student who is

- 1—overconfident.
- 2—disinterested.
- 3—bored.
- 4—discouraged.

3021. Perceptions result when a person

- 1—responds to visual cues first, then aural cues, and relates these cues to ones previously learned.
- 2—groups together bits of information.
- 3—gives meaning to sensations being experienced.
- 4—responds correctly to self-evaluation.

3022. The factor which contributes most to a student's failure to remain receptive to new experiences or which creates a tendency to reject additional training, is the student's

- 1—basic needs.
- 2—values.
- 3—goals.
- 4—negative self-concept.

3023. In the learning process, fear or the element of threat will

- 1—inspire the student to improve.
- 2—narrow the student's perceptual field.
- 3—decrease the rate of associative reactions.
- 4—improve the student's ability to cope with the learning situation.

3024. Evoking student insights is one of the instructor's major responsibilities. This involves the

- 1—ability of a student to master the rote performance of a task that has been learned.
- 2—analysis of a student by the instructor.
- 3—student's grasp of principles as they are taught.
- 4—grouping of perceptions into meaningful wholes.

3025. Insights, as applied to learning, involve a person's

- 1—awareness of those processes which are not immediately apparent.
- 2—ability to recognize the reason for learning a procedure.
- 3—self-concept of self-image.
- 4—grouping of associated perceptions into meaningful wholes.

3026. Instruction, as opposed to the trial and error method of learning, is desirable because competent instruction speeds the learning process by

- 1—eliminating the practice of exploring and experimenting.
- 2—motivating the student to a better performance.
- 3—emphasizing only the important points of training.
- 4—teaching the relationship of perceptions as they occur.

3027. A basic need that affects all of a person's perceptions is the need to

- 1—enhance the person's own organized self.
- 2—accomplish a higher level of training.
- 3—avoid areas of any threat to success.
- 4—maintain a minimum socioeconomic status.

3028. What is the basis of all learning?

- 1—Perception.
- 2—Insight.
- 3—Positive self-concept.
- 4—Motivation.

3029. In levels of learning, what are the steps of progression?

- 1—Rote, understanding, correlation, application.
- 2—Understanding, rote, application, correlation.
- 3—Rote, understanding, application, correlation.
- 4—Rote, application, understanding, correlation.

3030. The level of learning at which a person can copy a sequence of movements is

- 1—initiative.
- 2—basic.
- 3—rote.
- 4—random.

3031. A basic motivation for all human endeavor is the desire

- 1—for personal comfort.
- 2—for group approval.
- 3—for personal gain.
- 4—for achievement.

3032. The level of learning at which the student becomes able to associate an element which has been learned with other blocks of learning is

- 1—application.
- 2—association.
- 3—cogitation.
- 4—correlation.

3033. The best way to prepare a student to perform a task is to

- 1—provide a clear, step-by-step example.
- 2—provide the references to be reviewed.
- 3—lead the student very slowly through the test.
- 4—give the student an outline of the task.

3034. On a graph showing the typical progress in learning, the initial leveling off of the learning curve is called a

- 1—learning level-off.
- 2—learning plateau.
- 3—learning reverse.
- 4—learning gradient.

3035. A primary consideration in planning for student performance is the

- 1—student's motivational level.
- 2—student's intellectual level.
- 3—course completion date.
- 4—length of the practice session.

3036. According to one theory, some forgetting is due to the practice of submerging an unpleasant experience into the subconscious. This is called

- 1—blanking.
- 2—interference.
- 3—inhibition.
- 4—repression.

3037. When the learning of similar things overshadows other learning experiences, it is called

- 1—interference.
- 2—interruption.
- 3—compensation.
- 4—correlation.

3038. Factual data that is lost from conscious memory after several years is lost due to

- 1—disuse.
- 2—distancing.
- 3—subconscious blocks.
- 4—interference.

3039. Responses that produce a pleasurable return are called

- 1—reward.
- 2—recognition.
- 3—praise.
- 4—positive feedback.

3040. To ensure proper habits and correct techniques during training, an instructor should

- 1—introduce tasks which are difficult and challenging to the student.
- 2—use the building block technique of instruction.
- 3—always repeat subject matter the student has already learned.
- 4—accept faulty performance during the early phase of training and correct these faults later.

3041. Which of the student's human needs offers the greatest challenge to the instructor?

- 1—Social needs.
- 2—Egoistic needs.
- 3—Physical needs.
- 4—Self-fulfillment needs.

3042. The performance of rectangular patterns helps a student fly traffic patterns. What type of transfer of learning is this?

- 1—Lateral.
- 2—Positive.
- 3—Negative.
- 4—Concomitant.

3043. Which transfer of learning occurs when the performance of a maneuver interfered with the learning of another maneuver?

- 1—Adverse.
- 2—Positive.
- 3—Negative.
- 4—Correlated.

3044. To enhance the instructor's relationship with students, an instructor should be aware that students have

- 1—a tendency to try to gain the most with the least amount of effort, because people are inherently lazy.
- 2—motivations and goals that they try to satisfy.
- 3—submitted themselves to the dominance of the instructor.
- 4—difficulty accepting criticism whether constructive or not.

3045. After individuals are physically comfortable and have no fear for their safety, which human need then becomes the prime influence on their behavior?

- 1—Physical.
- 2—Social.
- 3—Materialistic.
- 4—Egoistic.

3046. Before a student can concentrate on learning, which of the human needs must be satisfied?

- 1—Social.
- 2—Safety.
- 3—Physical.
- 4—Self-fulfillment.

3047. Among the various human needs, which of these is the individual first concerned about?

- 1—Security.
- 2—Safety.
- 3—Physical.
- 4—Self-esteem.

3048. Although defense mechanisms can serve a useful purpose, they can also be a hindrance because they

- 1—alleviate the cause of problems.
- 2—provide feelings of adequacy.
- 3—involve self-deception and distortion of reality.
- 4—can result in delusional behaviors.

3049. When a student asks irrelevant questions or refuses to participate in class activities, it usually is an indication of the defense mechanism known as

- 1—flight.
- 2—aggression.
- 3—resignation.
- 4—substitution.

3050. Taking physical or mental flight is a defense mechanism that students use when they

- 1—cannot accept the real reasons for their behavior.
- 2—attempt to justify actions that otherwise would be unacceptable.
- 3—become bewildered and lost in the advanced phase of training.
- 4—want to escape from frustrating situations.

3051. When a student uses excuses to justify inadequate performance, it is an indication of the defense mechanism known as

- 1—intellectualization.
- 2—flight.
- 3—aggression.
- 4—rationalization.

3052. When students subconsciously use the defense mechanism called rationalization, they

- 1—use excuses to justify acceptable behavior.
- 2—develop symptoms that give them excuses for removing themselves from frustration.
- 3—become aggressive against something or somebody.
- 4—cannot accept the real reasons for their behavior.

3053. When students become so frustrated they no longer believe it profitable or even possible to work further, they usually display which defense mechanism?

- 1—Rationalization.
- 2—Avoidance.
- 3—Aggression.
- 4—Resignation.

3054. When a student becomes bewildered and lost in the advanced phase of training after completing the early phase without grasping the fundamentals, the defense mechanism is usually in the form of

- 1—rationalization.
- 2—aggression.
- 3—resignation.
- 4—passivity.

3055. When students display the defense mechanism called aggression, they

- 1—attempt to justify actions that otherwise would be unacceptable.
- 2—become so frustrated they lose interest and give up.
- 3—become visibly angry, upset, and childish.
- 4—may refuse to participate in the activities of the class.

3056. When a student engages in daydreaming, it is the defense mechanism of

- 1—sublimation.
- 2—fantasy.
- 3—avoidance.
- 4—flight.

3057. Which of these would more likely result in students becoming frustrated?

- 1—Giving the students praise too freely.
- 2—Presenting a topic or maneuver in great detail.
- 3—Telling the students that their work is unsatisfactory with no explanation.
- 4—Covering up instructor mistakes or bluffing when the instructor is in doubt.

3058. When students are unable to see the benefits or purpose of a lesson they will

- 1—increase their efforts.
- 2—be further motivated.
- 3—want to learn more.
- 4—be more frustrated.

3059. When the instructor keeps the student informed of lesson objectives and completion standards, it minimizes the student's

- 1—insecurity.
- 2—motivation.
- 3—individuality.
- 4—aggressiveness.

3060. Student confidence tends to be destroyed if instructors

- 1—direct and control the student's actions and behavior.
- 2—identify the student's errors and failures.
- 3—constructively criticize the student's errors.
- 4—bluff whenever in doubt about some point.

3061. Instructors who limit their thinking to the whole group without considering the individuals within that group are

- 1—using a good lecture technique.
- 2—using an excellent time-saving measure.
- 3—assuming all students have an average personality.
- 4—presenting information efficiently for maximum retention.

3062. The effectiveness of communication between the instructor and the student is measured by the

- 1—degree of attention the student gives to the instructor during a lesson.
- 2—degree of motivation manifested by the student.
- 3—similarity between the idea transmitted and the idea received.
- 4—lack of confusion shown.

3063. Successful communicators speak or write from a background of

- 1—specialized experience.
- 2—technical training.
- 3—up-to-date, stimulating material.
- 4—specialized education in effective communication.

3064. To communicate effectively, instructors must

- 1—reveal a positive and confident attitude while delivering their message.
- 2—limit the method of communication to one channel (hearing, seeing, or feeling) to avoid confusion.
- 3—be authoritarian to keep the student's attention.
- 4—have highly organized notes.

3065. Effective communication, during student instruction, has taken place when

- 1—the student is able to pass a test on the issues presented.
- 2—the student is able to repeat the information that has been received.
- 3—information is provided in such a way that it changes the behavior of the student.
- 4—information is transmitted and received.

3066. Effective communication has taken place when, and only when, the

- 1—receivers react with understanding and change their behavior accordingly.
- 2—communicator has convinced the listener there is a need to know the ideas presented.
- 3—receiver has the ability to question and comprehend the ideas that have been transmitted.
- 4—sender uses a vocabulary (written or oral) that is meaningful to the reader or listener.

3067. In the communication process, the communicator will be more successful in gaining and retaining the receiver's attention by

- 1—lecturing without audiovisual aids.
- 2—being very friendly.
- 3—using a varied communicative approach.
- 4—presenting the material in a strict, technical way.

3068. By the use of abstractions in the communication process, the communicator will

- 1—enhance the involvement of the receivers.
- 2—bring forth specific items of experience in the minds of the receivers.
- 3—be using words which refer to objects or ideas that human beings can experience directly.
- 4—not evoke in the listener's or reader's mind the specific items of experience the communicator intends.

3069. The danger in using abstract words is that they

- 1—will not evoke the specific items of experience in the listener's mind that the communicator intends.
- 2—call forth different mental images in the minds of the receivers.
- 3—control the image produced in the listener's mind.
- 4—refer to things that people are familiar with or can relate to.

3070. Probably the greatest single barrier to effective communication is the

- 1—confusion between the symbol and the thing symbolized.
- 2—use of abstractions by the communicator.
- 3—use of statements which contain inaccuracies.
- 4—lack of a common core of experience between communicator and receiver.

3071. Probably the greatest single barrier to effective communication in the teaching process is a lack of

- 1—personality harmony between instructor and student.
- 2—time available for communication.
- 3—a common experience level between the instructor and student.
- 4—respect for the instructor.

3072. A communicator's words cannot communicate the desired meaning to another person unless the

- 1—listener or reader has had some experience with the objects or concepts to which these words refer.
- 2—words give the meaning that is in the mind of the receiver.
- 3—communicator avoids the use of words which relate to the receiver's past experiences.
- 4—words have meaningful referents.

3073. What is the proper sequence in which the instructor should employ the four basic steps in the teaching process?

- 1—Explanation, trial and practice, evaluation, and review.
- 2—Preparation, presentation, application, and review and evaluation.
- 3—Explanation, demonstration, practice, and evaluation.
- 4—Preparation, trial and practice, evaluation, and review.

3074. Which method of presentation is desirable for teaching a skill such as cross-country planning?

- 1—Demonstration/performance.
- 2—Integrated instruction.
- 3—Presentation and application.
- 4—Guided discussion.

3075. In the teaching process, which method of presentation is suitable for presenting new material, for summarizing ideas, and for showing relationships between theory and practice?

- 1—Guided discussion method.
- 2—Lecture method.
- 3—Demonstration/performance method.
- 4—Integrated instruction method.

3076. Evaluation of student performance and accomplishment during a lesson should be based on the

- 1—student's background and past experiences.
- 2—student's actual performance as compared to an arbitrary standard.
- 3—direct comparison with the performance of other students in the class.
- 4—objectives and goals that were established in the lesson plan.

3077. To enhance a student's acceptance of further instruction, the instructor should

- 1—establish performance standards a little above the student's actual ability.
- 2—encourage the competition between students.
- 3—continually prod the student to maintain motivational levels.
- 4—keep the student informed of the progress made.

3078. Which statement is true regarding student evaluation?

- 1—Tests should be developed in such a manner that the students are evaluated on standards higher than their expected performance level.
- 2—If deficiencies or faults not associated with the present lesson are revealed, they shall be ignored and corrected at a later date.
- 3—The student's own evaluations can only be objective.
- 4—Evaluation of the student's learning should be an integral part of each lesson.

3079. The method of arranging lesson material from the simple to complex, past to present, and known to unknown, is one that

- 1—creates student thought pattern departures.
- 2—the instructor should avoid.
- 3—shows the relationships of the main points of the lesson.
- 4—requires students to actively participate in the lesson.

3080. The proper sequence for the subparts of an introduction is

- 1—attention, motivation, and overview.
- 2—development, evaluation, and conclusion.
- 3—attention, development, and overview.
- 4—overview, motivation, and conclusion.

3081. When teaching from the known to the unknown, an instructor is using the student's

- 1—likes and dislikes.
- 2—previous experiences and knowledge.
- 3—anxieties and insecurities.
- 4—previously held opinions both valid and invalid.

3082. In organizing lesson material, which step should relate the coverage of material to the entire course?

- 1—Conclusion.
- 2—Overview.
- 3—Summary.
- 4—Introduction.

3083. In developing a lesson, the instructor must logically organize explanations and demonstrations to help the student

- 1—understand the relationships of the main points of the lesson.
- 2—learn by rote so that performance of the procedure will become automatic.
- 3—understand the separate items of knowledge.
- 4—know what to study in advance.

3084. Which of these should be the first step in preparing a lecture?

- 1—Researching the subject.
- 2—Developing the main ideas or key points.
- 3—Organizing the material.
- 4—Establishing the objective and desired outcome.

3085. In the teaching lecture, the use of which of these would detract from the instructor's dignity and reflect upon the student's intelligence?

- 1—Errors in grammar and vulgarisms.
- 2—Picturesque slang.
- 3—Free-and-easy colloquialisms.
- 4—Abstractions.

3086. What is one advantage of a lecture?

- 1—It provides for student participation.
- 2—It provides the instructor with an accurate means of monitoring student learning.
- 3—Maximum attainment in all types of learning outcomes is possible.
- 4—Many ideas can be presented in a short time.

3087. When it appears students have adequately discussed the ideas presented during a guided discussion, one of the most valuable tools an instructor can use is

- 1—an interim summary of what the students accomplished.
- 2—a written test on the subject discussed.
- 3—an overview of previous lessons.
- 4—a session of verbal testing.

3088. In a guided discussion, lead-off questions should usually begin with

- 1—where.
- 2—when.
- 3—what.
- 4—why.

3089. Learning is produced in a guided discussion through the skillful use of

- 1—demonstrations.
- 2—questions.
- 3—explanations.
- 4—rejoinders.

3090. Which statement about the guided discussion: method of teaching is true?

- 1—Students without a background in the subject should be included in the discussion.
- 2—Unless the students have some knowledge to exchange with each other, they cannot reach the desired learning outcomes.
- 3—The instructor should answer all student questions.
- 4—Students do not need to be aware of the lesson objective.

3091. Which of these questions would be best as a lead-off question for a guided discussion on the subject of torque?

- 1—Does torque cause the airplane to turn?
- 2—Does torque affect the airplane?
- 3—How does torque affect the airplane?
- 4—How many factors are involved in torque effects?

3092. In preparing questions for a guided discussion, the instructor should remember that the purpose is to

- 1—bring about discussion to develop an understanding of the subject.
- 2—get answers to the student's questions.
- 3—evaluate and grade the student's knowledge.
- 4—develop the student's verbal abilities.

3093. In a guided discussion, learning is produced through

- 1—tutorial instruction.
- 2—explanations and demonstrations.
- 3—discussion of a topic in which students have little or no background.
- 4—the skillful use of questions.

3094. Which type question should an instructor use to begin a guided discussion with a group of students?

- 1—Direct.
- 2—Relay.
- 3—Overhead.
- 4—Follow-up.

3095. In the demonstration/performance method of instruction, which two separate actions are performed concurrently?

- 1—Instructor explanation and evaluation.
- 2—Student performance and instructor supervision.
- 3—Instructor demonstration and evaluation.
- 4—Instructor explanation and student demonstration.

3096. What is the last step in the demonstration/performance method?

- 1—Student performance.
- 2—Demonstration.
- 3—Evaluation.
- 4—Instructor supervision.

3097. What are the essential steps in the demonstration/performance method of teaching?

- 1—Demonstration, student performance, and evaluation.
- 2—Demonstration, practice, and evaluation.
- 3—Motivation, presentation, summary, and closure.
- 4—Explanation, demonstration, student performance, instructor supervision, and evaluation.

3098. The instructor can best inspire active student participation in informal lectures through the use of

- 1—visual aids.
- 2—negative motivations.
- 3—questions.
- 4—inspirational talks.

3099. The distinguishing characteristic of an informal lecture is the

- 1—requirement for detailed notes.
- 2—extemporaneous delivery.
- 3—use of visual aids.
- 4—student's participation.

3100. The teaching lecture is probably best delivered by

- 1—reading from a typed or written manuscript.
- 2—reciting memorized material without the aid of a manuscript.
- 3—speaking impromptu without preparation.
- 4—speaking extemporaneously from an outline.

3101. Which teaching method is particularly suitable for introducing a subject and is the most economical in terms of the time required to present a given amount of material?

- 1—Briefing.
- 2—Programmed instruction.
- 3—Demonstration.
- 4—Lecture.

3102. In regard to the teaching lecture, which of these statements is true?

- 1—The teacher receives direct reaction from the student in the form of verbal or motor activity.
- 2—Using sentences of equal length enlivens the lecture.
- 3—The instructor must develop a keen perception for subtle responses and must be able to interpret the meaning of these reactions.
- 4—Delivering the lecture in an extemporaneous manner is not recommended.

3103. Which statement is true about an instructor's critique of a student's performance?

- 1—The critique should be subjective rather than objective in nature.
- 2—It is a step in the learning process, not in the grading process.
- 3—The instructor's comments and recommendations should be general rather than specific.
- 4—It must be given in written form.

3104. Which statement is true about instructors' critiques?

- 1—Instructors should rely on their position to make a critique more acceptable to their students.
- 2—A comprehensive critique must treat every aspect of the student's performance in detail.
- 3—Before students willingly accept their instructor's critique, they must first accept the instructor.
- 4—A critique may not be used as a reteaching device.

3105. The purpose of a critique is to

- 1—identify only the student's faults and weaknesses.
- 2—evaluate the student and assign a grade.
- 3—provide direction and guidance to raise the level of the student's performance.
- 4—give the students a delayed evaluation of their performance.

3106. When an instructor critiques a student, it should always be

- 1—done in private.
- 2—conducted immediately after the student's performance.
- 3—subjective rather than objective.
- 4—concerned with student weaknesses not strengths.

3107. An instructor's critique of a student's performance should

- 1—treat every aspect of the performance in detail.
- 2—provide direction and guidance to improve performance.
- 3—be private so that the student is not embarrassed.
- 4—be general in nature.

3108. Which statement is true about an instructor's critique of a student's performance?

- 1—Praise for praise's sake is of value.
- 2—A standardized critique is adequate for most students.
- 3—It should treat every aspect of the performance in detail.
- 4—It should be constructive and objective.

3109. To be effective, a critique should

- 1—minimize the student's importance.
- 2—treat every aspect of the performance in detail.
- 3—place more emphasis on a student's weaknesses.
- 4—be flexible enough to satisfy the requirements of the moment.

3110. When conducting a critique, the instructor should

- 1—cover all of the student's faults or weaknesses, large or small.
- 2—emphasize the points covered with dogmatic and absolute statements.
- 3—cover only a few well-made points rather than a large number of inadequately developed points.
- 4—praise the student before criticizing, even if undeserved.

3111. Of the following, which is a valid reason for the use of proper oral quizzing during a lesson?

- 1—It is a good check to see if the students are paying attention.
- 2—It helps the instructor determine the general intelligence level of the students.
- 3—It identifies points that need less emphasis.
- 4—It promotes active student participation.

3112. During oral quizzing in a given lesson, effective questions should

- 1—relate to more than one thought or idea.
- 2—be brief and concise.
- 3—include a combination of who, what, when, or where.
- 4—divert the student's thoughts to subjects covered in previous lessons.

3113. In all quizzing as a portion of the instruction process, the questions should

- 1—ignore the student's level of learning.
- 2—call for specific answers and be readily evaluated by the instructor.
- 3—include questions with more than one central idea to evaluate how completely a student understands the subject.
- 4—include catch questions to develop the student's perceptive power.

3114. Proper quizzing by the instructor during a lesson can have which of these results?

- 1—It denies active student participation.
- 2—It encourages rote responses from the students.
- 3—It permits the introduction of new material which was not covered previously.
- 4—It identifies points which need more emphasis.

3115. One desirable result of proper oral quizzing by the instructor is to

- 1—fulfill the requirements set forth in the overall objectives of the course.
- 2—reveal the essential information from which the student can determine progress.
- 3—reveal the effectiveness of the instructor's training procedures.
- 4—fulfill the instructor's goals and objectives.

3116. To be effective in oral quizzing during the conduct of a lesson, a question should

- 1—center on only one idea.
- 2—divert the student's thoughts to subjects covered in other lessons.
- 3—be easy for the student at that particular stage of training.
- 4—include a combination of where, how, and why.

3117. To answer a student's question, it is most important that the instructor

- 1—have complete knowledge of the subject.
- 2—clearly understand the question.
- 3—introduce more complicated information to fully answer the question.
- 4—put off the student unless the question is relevant.

3118. Which type of test item creates the greatest probability of guessing?

- 1—Matching.
- 2—Association.
- 3—Multiple choice.
- 4—True-false.

3119. Which of the following is the main disadvantage of supply-type (essay) test items?

- 1—They do not require students to organize their knowledge.
- 2—They cannot be graded with uniformity.
- 3—They are readily answered by guessing.
- 4—Their high level of objectivity.

3120. The characteristic of a written test, which measures small differences in achievement between students, is its

- 1—discrimination.
- 2—comprehensiveness.
- 3—validity.
- 4—reliability.

3121. A written test has validity when it

- 1—actually measures what it is supposed to measure and nothing else.
- 2—yields consistent results.
- 3—samples liberally whatever is being measured.
- 4—is easy to administer.

3122. Which of the following principles should be followed in the development of true-false tests?

- 1—Establish patterns in the sequence of correct responses for easier scoring.
- 2—Include complex statements in the questions.
- 3—Avoid absolutes such as "all," "every," and "only."
- 4—Include one or more ideas in each statement in the questions.

3123. Which of the following is a characteristic of supply-type (essay) test items?

- 1—It allows for testing on more areas than do selection-type items.
- 2—It is well adopted to the testing of knowledge of facts and details.
- 3—The test results would be graded the same regardless of the student or the grader.
- 4—The same test graded by different instructors would probably be given different scores.

3124. When a written test shows positive discrimination, it will

- 1—include a representative and comprehensive sampling of the course objectives.
- 2—not measure what is intended.
- 3—sample liberally what is being measured.
- 4—distinguish between the students who are low and those who are high in achievement.

3125. A written test is said to be comprehensive when it

- 1—includes all levels of difficulty.
- 2—shows a wide range of scores.
- 3—samples liberally whatever is being measured.
- 4—measures knowledge of the same topic in many different ways.

3126. A written test which has reliability is one which

- 1—actually measures what it is supposed to measure and nothing else.
- 2—yields consistent results.
- 3—samples liberally whatever is being measured.
- 4—measures small differences in the achievement of students.

3127. One of the main advantages of selection-type (multiple choice) test items over supply-types (essay) test items, is that the selection-type

- 1—are difficult to grade uniformly.
- 2—would be graded objectively regardless of the student or the grader.
- 3—precludes comparison of students under one instructor with those of another instructor.
- 4—measures the student's generalized understanding of a subject.

3128. Which statement is true relative to effective multiple-choice test items?

- 1—Items should call for abstract background knowledge.
- 2—Statements containing absolutes are usually true.
- 3—Negative words or phrases need not be emphasized.
- 4—Keep all alternatives of approximately equal length.

3129. Which of these is one of the major difficulties encountered in the construction of multiple-choice test items?

- 1—Adapting the items to statistical item analysis.
- 2—Keeping all responses approximately equal in length.
- 3—Phrasing the item in question form in lieu of incomplete statement form.
- 4—Inventing distractors which will be attractive to students lacking knowledge or understanding.

3130. Which statement is true about multiple-choice test items that are intended to measure achievement at a higher level of learning?

- 1—Some or all of the alternatives should be nearly correct but only one should be clearly correct.
- 2—The use of common errors as distracting alternatives to divert the student from the correct response is ineffective and invalid.
- 3—It is permissible for one item to be dependent on another.
- 4—Responses involving numbers should be randomized.

3131. In a written test, which type of test items makes it easier to compare the performance of students within the same class or in different classes?

- 1—Selection.
- 2—Supply.
- 3—Essay.
- 4—True-false.

3132. Which type test is desirable for evaluating training that involves an operation, procedure, or process?

- 1—Oral.
- 2—Written.
- 3—Performance.
- 4—Aptitude.

3133. Which is a true statement concerning the use of visual aids?

- 1—Visual aids should not be used to cover a subject in less time.
- 2—Visual aids can be used to emphasize the key points in a lesson.
- 3—Visual aids ensure getting and holding the student's attention.
- 4—Visual aids increase the effort to organize knowledge.

3134. Instructional aids used in the teaching/learning process should be

- 1—compatible with the learning outcomes to be achieved.
- 2—self-supporting and should require no explanation.
- 3—selected prior to developing and organizing the lesson plan.
- 4—designed to get the student's attention on the aid rather than the subject.

3135. Instructional aids used in the teaching/learning process should not be used

- 1—to concentrate on key points.
- 2—in conjunction with verbal presentations.
- 3—for teaching more in less time.
- 4—as a crutch by the instructor.

3136. The use of instructional aids should be based on their ability to support a specific point in the lesson. What is the first step to determine if and where instructional aids are necessary?

- 1—Decide at what point in the lesson the student's interest must be rekindled.
- 2—Clearly establish the lesson objective, being certain what must be communicated.
- 3—Organize subject material into an outline or a lesson plan.
- 4—Gather necessary data by researching for support material.

3137. An instructor cannot retain the reputation of a professional if that person

- 1—does anything which implies degrading the student.
- 2—does in-depth study and research.
- 3—is not paid what they are worth.
- 4—is calm, thoughtful, and disciplined.

3138. The professional relationship between the instructor and the student should be based upon

- 1—the need to disregard the student's personal faults, interests, or problems.
- 2—setting the learning objectives very high so that the student is challenged continually.
- 3—the mutual acknowledgment that they are important to each other and both are working toward the same objective.
- 4—a close friendship between the student and instructor.

3139. Which statement is true regarding true professionalism as an instructor?

- 1—To achieve professionalism, actions and decisions must be limited to standard patterns and practices.
- 2—A single definition of professionalism would encompass all of the qualifications and considerations which must be present.
- 3—The flight instructor need not be fully qualified as a pilot to be a professional.
- 4—Anything less than sincere performance destroys the effectiveness of the professional instructor.

3140. An instructor can most effectively maintain a high level of student motivation by

- 1—continually challenging the student to meet the highest objectives of training that can be established.
- 2—making each lesson a pleasurable experience.
- 3—easing the standards for an apprehensive student.
- 4—grading on a curve so most of the students are able to pass the course.

3141. What should an instructor do with a student who assumes that correction of errors is unimportant?

- 1—Complex flight maneuvers should be divided into their elements.
- 2—Try to reduce the student's overconfidence to reduce the chance of an accident.
- 3—Deficiencies should be invented for the student's benefit.
- 4—Raise the standard of performance for each lesson, demanding greater effort.

3142. What should an instructor do if a student's slow progress is due to discouragement and a lack of confidence?

- 1—Emphasize the negative aspects of poor performance by pointing out the serious consequences.
- 2—Assign subgoals which can be attained more easily than the normal learning goals.
- 3—Provide unlimited help and encouragement.
- 4—Raise the performance standards so that the student will gain satisfaction in meeting higher standards.

3143. Which statement is true regarding the achievement of an adequate standard of performance?

- 1—A flight instructor should devote major effort and attention to the continuous evaluation of student performance.
- 2—Flight instructors fail to provide competent instruction when they permit their students to partially learn an important item of knowledge or skill.
- 3—Flight instructors will effect a genuine improvement in the student/instructor relationship by lowering standards.
- 4—Allowing a hazardous student inadequacy to go uncorrected is unimportant since it will be corrected with experience.

3144. Which statement is true regarding positive or negative approaches in aviation instructional techniques?

- 1—The introduction of emergency procedures before the student is acquainted with normal operations is not likely to be discouraging nor effect learning.
- 2—Flight instructors should ignore the existence of negative factors throughout training to prevent undue stress on the student.
- 3—A positive approach, to be effective, will point out the pleasurable features of aviation before the unpleasant possibilities are discussed.
- 4—A student with a good self-image will not be affected by an instructor who emphasizes the critical aspects of flying early in training.

3145. Which of these is an example of a positive approach in the first flight lesson of a student with no previous aviation experience?

- 1—A normal flight to a nearby airport and return.
- 2—A series of simulated forced landings.
- 3—A series of full stalls and spins.
- 4—Instruction in the extreme care which must be taken in taxiing an airplane.

3146. Should an instructor be concerned about an apt student who makes very few mistakes?

- 1—Yes; the student will lose confidence in the instructor unless the instructor invents deficiencies in the student's performance.
- 2—Yes; faulty performance may soon appear due to student overconfidence.
- 3—No; it is a direct reflection of the instructor's skillful training.
- 4—No; some students have an innate, natural aptitude for flying well.

3147. Faulty performance due to student overconfidence should be corrected by

- 1—increasing the standard of performance for each lesson.
- 2—highly praising the student when no mistakes are made.
- 3—providing strong, negative evaluation at the end of each lesson.
- 4—praising the student only when the performance is perfect.

3148. If a student's progress is slow due to discouragement and a lack of confidence, the instructor should

- 1—have the student practice elements of the task involved until confidence and ability are gained.
- 2—discontinue directing the student's attention to the unacceptable performance.
- 3—accept the slow rate of progress and accept a substandard performance.
- 4—provide unlimited help and encouragement.

3149. When a student correctly understands the situation and knows the correct procedure for the task, but fails to act at the proper time, the student most probably

- 1—feels that the instructor is making unreasonable demands for performance and progress.
- 2—lacks self-confidence.
- 3—will be unable to cope with the demands of flying.
- 4—is handicapped by indifference or lack of interest.

3150. What should an instructor do if a student is suspected of not fully understanding the principles involved in a task, even though the student can correctly perform the task?

- 1—Do not require the student to vary the performance of the maneuver at all.
- 2—Take the controls away from the student and give a demonstration on the practical application of the principles involved in the task.
- 3—Require the student to apply the same elements to the performance of other tasks.
- 4—Emphasize that mastery of the task is more important than complete understanding.

3151. When under stress, normal individuals usually react

- 1—with very rapid changes in emotions, severe anger at the instructor, or others.
- 2—with marked changes in mood on different lessons such as excellent morale followed by deep depression.
- 3—by responding rapidly and exactly, often automatically, within the limits of their experience and training.
- 4—inappropriately such as extreme overcooperation, painstaking self-control, and inappropriate laughing or singing.

3152. The instructor can counteract anxiety in a student by

- 1—treating the student's fears as a normal reaction.
- 2—continuously citing the unhappy consequences of faulty performance.
- 3—discontinuing instruction in tasks that cause anxiety.
- 4—allowing the student to decide when he/she is ready for a new maneuver to be introduced.

3153. Which of the following would most likely be an indication that a student is reacting abnormally to stress?

- 1—Slow changes in emotions.
- 2—Automatic response to a given situation.
- 3—Rapid thinking and reaction.
- 4—Inappropriate laughter or singing.

3154. Which of the following would most likely be an indication that a student is reacting abnormally to stress?

- 1—Slow progress.
- 2—Hesitancy to act.
- 3—Automatic response to a given situation.
- 4—Extreme overcooperation.

3155. The basic demonstration/performance method of instruction consists of several steps in proper order. They are

- 1—instructor does—instructor tells; student does—instructor tells; student does—student tells; student does—instructor evaluates.
- 2—instructor tells—instructor does; student tells—instructor does; student does—instructor evaluates.
- 3—instructor tells—student does; student tells—student does; student does—instructor evaluates.
- 4—instructor tells—instructor does; student tells—instructor does; student tells—student does; student does—instructor evaluates.

3156. The objective of integrated flight instruction is to

- 1—help the student develop habit patterns for observance of and reliance on flight instruments.
- 2—correlate the ground and flight training curriculums.
- 3—develop the student's ability to fly in instrument meteorological conditions.
- 4—ensure that the student is not overly dependent on the instruments during VFR flight.

3157. The primary objective of integrated flight instruction is the

- 1—developing of the habit of occasionally monitoring their own and the aircraft's performance.
- 2—difference in the pilot's operation of the flight controls in VFR and IFR conditions.
- 3—building of confidence in coping with marginal weather.
- 4—formation of firm habit patterns for observing and relying on flight instruments.

3158. Which of the following is an acceptable procedure when using the integrated method of flight instruction?

- 1—Prior to the first flight, clearly explain the differences in the manipulation of flight controls for maintaining aircraft control when under simulated instrument conditions and when using references outside the aircraft.
- 2—Use alternate and distinct periods devoted entirely to instrument flight or to visual flight.
- 3—Include in the student's first instruction on the function of flight controls the instrument indication to be expected, as well as the outside references used in attitude control.
- 4—The integrated technique of flight instruction can be taught without the use of a view limiting device.

3159. During integrated flight instruction the instructor must be sure that the students

- 1—develop the habit of looking for other traffic.
- 2—are able to control the aircraft for extended periods if outside references are lost.
- 3—can depend on the flight instruments when maneuvering by outside references.
- 4—have learned to rely mainly on the attitude indicator when flying by instrument references.

3160. Which obstacle to learning is a greater deterrent to learning pilot skills than is generally recognized?

- 1—Anxiety.
- 2—Physical discomfort.
- 3—Irritation.
- 4—Emotional upsets.

3161. What is the primary consideration in determining the length and frequency of flight instruction periods?

- 1—Physical conditioning.
- 2—Anxiety.
- 3—Fatigue.
- 4—Mental acuity.

3162. Students quickly become apathetic when they

- 1—are assigned goals that are difficult but possible.
- 2—recognize that the instructor is inadequately prepared.
- 3—understand the objectives toward which they are working.
- 4—are required to operate the flight controls for most of the lesson.

3163. Students who grow impatient when learning the basic elements of a task are those who

- 1—should not be held back by insisting that the immediate goal be reached before they progress to the next step in training.
- 2—possess superior motivation.
- 3—are less easily discouraged than the unaggressive students.
- 4—should have the preliminary training presented one step at a time with clearly stated goals for each step.

3164. Which of the following is one of the ways in which anxiety or apprehension will affect a student?

- 1—Anxiety tends to increase concentration, but interferes with muscular coordination.
- 2—Anxiety causes dispersal of the student's attention over such a wide range of matters as to interfere with normal reactions.
- 3—Anxiety may limit the student's ability to learn from perceptions.
- 4—Anxiety will speed up the learning process for the student if properly controlled and directed by the instructor.

3165. Which statement is true concerning extraneous blocks of instruction during a course of training?

- 1—They provide measurable objectives.
- 2—They are usually necessary parts of the total objective.
- 3—They detract from the completion of the final objective.
- 4—They assist in the attainment of the lesson's objective.

3166. Development and assembly of blocks of learning in their proper relationship will provide a means for

- 1—taking full advantage of both positive and negative transfer of learning.
- 2—allowing the student to master the segments of the overall pilot performance requirements individually and combining these with other related segments.
- 3—both the instructor and student to easily correct faulty habit patterns.
- 4—challenging the student by progressively increasing the units of learning.

3167. In planning any instructional activity, the first consideration should be to

- 1—establish common ground between the instructor and student.
- 2—determine aptitudes of the students.
- 3—identify the blocks of learning which make up the overall objective.
- 4—determine the overall objectives and standards.

3168. Each lesson of the training syllabus includes

- 1—introduction, development, and conclusion.
- 2—objective, content, and completion standards.
- 3—attention, motivation, and overview.
- 4—research, presentation, and wrap-up.

3169. In planning instructional activity, the second step is to

- 1—determine the personality and intelligence level of assigned students.
- 2—identify the blocks of learning which constitute the necessary parts of the total objective.
- 3—establish the overall objectives and standards.
- 4—develop lesson plans for each period or unit of instruction.

3170. When it is impossible to conduct a scheduled lesson, it is preferable for the instructor to

- 1—conduct a lesson that is not predicated completely on skills to be developed during the lesson which was postponed.
- 2—proceed to the next scheduled lesson, or if this is not practical, cancel the lesson.
- 3—postpone all lessons until the scheduled lesson can be completed.
- 4—revise the lesson objective.

3171. Which statement is true regarding lesson plans?

- 1—The rigid use of prepared lesson plans for all students is most effective.
- 2—Lesson plans should not be directed toward the course objective; only to the lesson objective.
- 3—Lesson plans help instructors keep a constant check on their own activity as well as that of their students.
- 4—To be effective, lesson plans must be in verbal form.

3172. With regard to the characteristics of a well-planned lesson, each lesson should contain

- 1—every bit of information needed to reach the objective of the training syllabus.
- 2—information that is independent of earlier lessons.
- 3—new material that is related to the lesson previously presented.
- 4—one very basic element of a simple principle, procedure, or skill.

3173. In developing a lesson plan for an in-flight lesson on ground reference maneuvers, which of these would correctly state the true objective of the lesson?

- 1—"To explain and demonstrate the principles of planning and following a pattern. . . ."
- 2—"To cover the principles of planning and following a pattern. . . ."
- 3—"To develop the student's skill in planning and following a pattern. . . ."
- 4—"To learn the principles of planning and following a pattern. . . ."

3174. Which statement is true about lesson plans?

- 1—An effective lesson plan may be only a mental outline.
- 2—The use of a rigidly prepared lesson plan should be used for an instructional flight.
- 3—It will eliminate the need for a review of earlier lessons.
- 4—The lesson should contain new facts, principles, procedures, or skills related to a previous lesson.

3175. If lesson plans are constructed in a proper manner, they will provide an outline for

- 1—proceeding from the unknown to the known.
- 2—the teaching procedure to be used in a single instructional period.
- 3—blocks of learning that become progressively larger in scope.
- 4—each lesson of the course without regard to the student/instructor relationship.

3176. In figure 1, section F is titled:

- 1—Demonstration.
- 2—Student's Actions.
- 3—Application.
- 4—Understanding.

3177. In figure 1, section A is titled:

- 1—Standard.
- 2—Objective.
- 3—Introduction.
- 4—Overview.

3178. In figure 1, section B is titled:

- 1—Blocks of Learning.
- 2—Course of Training.
- 3—Elements.
- 4—Motivation.

3179. In figure 1, section G is titled:

- 1—Conclusion.
- 2—Completion Standards.
- 3—Summary.
- 4—Evaluation.

3180. In figure 1, section E is titled:

- 1—Instructor's Actions.
- 2—Preparation.
- 3—Content.
- 4—Discussion.

3181. In figure 1, section C is titled:

- 1—Course of Training.
- 2—Training Schedule.
- 3—Overview.
- 4—Schedule.

3182. In figure 1, section D is titled:

- 1—Development.
- 2—Preparation.
- 3—Apparatus.
- 4—Equipment.

3183. The layer of the atmosphere typified by relatively small changes in temperature with increased height, except for a warming trend near the top, is the

- 1—troposphere.
- 2—tropopause.
- 3—stratosphere.
- 4—ionosphere.

3184. Which is the primary driving force of weather on Earth?

- 1—The Sun.
- 2—Coriolis.
- 3—Rotation of the Earth.
- 4—The wind.

3185. The average lapse rate in the troposphere

- 1—5.4° C per 1,000 feet.
- 2—3.0° C per 1,000 feet.
- 3—2.5° C per 1,000 feet.
- 4—2° C per 1,000 feet.

3186. If the air temperature is +16° C at an elevation of 3,000 feet and a standard (average) temperature lapse rate exists, what will be the approximate freezing level?

- 1—7,000 feet MSL.
- 2—9,000 feet MSL.
- 3—11,000 feet MSL.
- 4—14,000 feet MSL.

3187. If the air temperature is 8° C at an elevation of 1,350 feet and a standard (average) temperature lapse rate exists, what will be the approximate freezing level?

- 1—3,350 feet MSL.
- 2—5,350 feet MSL.
- 3—9,350 feet MSL.
- 4—10,285 feet MSL.

3188. The most frequent type of ground- or surface-based temperature inversion is that produced by

- 1—terrestrial radiation on a clear, relatively still night.
- 2—warm air being lifted rapidly aloft in the vicinity of mountainous terrain.
- 3—the movement of colder air under warm air or the movement of warm air over cold air.
- 4—widespread sinking of air within a thick layer aloft resulting in heating by compression.

3189. Which weather conditions should be expected beneath a low-level temperature inversion layer when the relative humidity is high?

- 1—Smooth air and poor visibility due to fog, haze, or low clouds.
- 2—Light wind shear and poor visibility due to light rain.
- 3—Turbulent air and poor visibility due to fog, low stratus type clouds, and showery precipitation.
- 4—Updrafts and turbulence due to surface heating, fair visibility, and cumulus clouds developing at the top of the inversion.

3190. What are the standard temperature and pressure values for sea level?

- 1— 15° C and 29.92" Hg.
- 2— 59° C and 1013.2 millibars.
- 3— 59° F and 29.92 millibars.
- 4— 15° C and 1013.2" Hg.

3191. Lines connecting points of equal pressure are called

- 1— isotachs.
- 2— isotherms.
- 3— isobars.
- 4— isogons.

3192. What causes wind?

- 1— Coriolis force.
- 2— The Earth's rotation.
- 3— Air mass modification.
- 4— Pressure differences.

3193. Select the true statement concerning isobars and windflow patterns around high- and low-pressure systems that are shown on a Surface Analysis Weather Map.

- 1— Surface winds flow perpendicular to the isobars.
- 2— When the isobars are close together, the pressure gradient force is greater and wind velocities are stronger.
- 3— Isobars connect contour lines of equal temperature.
- 4— When the isobars are far apart, crests of standing waves may be marked by stationary lenticular clouds.

3194. Which force, in the Northern Hemisphere, acts at a right angle to the wind and deflects it to the right until parallel to the isobars?

- 1— Centrifugal.
- 2— Pressure gradient.
- 3— Coriolis.
- 4— Advective.

3195. The windflow around a low pressure is

- 1— cyclonic.
- 2— anticyclonic.
- 3— adiabatic.
- 4— Coriolis.

3196. Winds at 5,000 feet AGL on a particular flight are southwesterly while most of the surface winds are southerly. This difference in direction is primarily due to

- 1— a stronger pressure gradient at higher altitudes.
- 2— friction between the wind and the surface.
- 3— stronger Coriolis force at the surface.
- 4— local terrain effects on pressure.

3197. In the Northern Hemisphere, a pilot making a long distance flight from east to west would most likely find favorable winds associated with high- and low-pressure systems by flying

- 1— to the north of a high and to the south of a low.
- 2— to the south of a high and to the north of a low.
- 3— through the center of highs and lows.
- 4— to the north of a high and a low.

3198. When flying from a high- to a low-pressure area in the Northern Hemisphere, the wind direction and velocity will be from the

- 1— left and decreasing.
- 2— left and increasing.
- 3— right and decreasing.
- 4— right and increasing.

3199. The general circulation of air associated with a high-pressure area in the Northern Hemisphere is

- 1— inward, downward, and counterclockwise.
- 2— outward, downward, and clockwise.
- 3— outward, upward, and counterclockwise.
- 4— inward, upward, and clockwise.

3200. Which statement is true regarding high- or low-pressure systems?

- 1— A high-pressure area or ridge is an area of rising air.
- 2— A low-pressure area or trough is an area of rising air.
- 3— Both high- and low-pressure areas are characterized by descending air.
- 4— A high-pressure area is a trough of descending air.

3201. Which statement is true with respect to a high- or low-pressure system?

- 1— A low-pressure area or trough is an area of descending air.
- 2— A high-pressure area or ridge is an area of descending air.
- 3— A high-pressure area or ridge is an area of rising air.
- 4— A low-pressure area is a ridge of descending air.

3202. Which is an operational consideration regarding actual air temperature and dewpoint temperature spread?

- 1— The temperature spread decreases as the relative humidity decreases.
- 2— The temperature spread decreases as the relative humidity increases.
- 3— The temperature spread increases as the relative humidity increases.
- 4— Temperature and dewpoint spread are not related to relative humidity.

3203. The ratio of the existing water vapor in the air, as compared to the maximum amount that could exist at a given temperature, is called

- 1— the condensation point.
- 2— saturation point.
- 3— relative humidity.
- 4— the dewpoint.

3204. What is meant by the term dewpoint?

- 1— The temperature to which air must be cooled to become saturated.
- 2— The temperature at which condensation and evaporation are equal.
- 3— The temperature at which dew will always form.
- 4— The spread between actual temperature and the temperature during evaporation.

3205. Rain that evaporates before reaching the ground is called

- 1—sublimation.
- 2—resurgent.
- 3—evaporative.
- 4—virga.

3206. What is the process by which ice can form on a surface directly from water vapor on a cold, clear night?

- 1—Sublimation.
- 2—Evaporation.
- 3—Supersaturation.
- 4—Condensation.

3207. Which precipitation type usually indicates freezing rain at higher altitudes?

- 1—Snow.
- 2—Hail.
- 3—Ice pellets.
- 4—Ice crystals.

3208. When cold air moves over a warmer lake, what weather phenomena is likely to occur on the leeward side of the lake?

- 1—Fog.
- 2—Showers.
- 3—No clouds.
- 4—Continuous precipitation.

3209. From which measurement of the atmosphere can stability be determined?

- 1—Low-level winds.
- 2—Ambient lapse rate.
- 3—Atmospheric pressure.
- 4—Difference between standard temperature and surface temperature.

3210. The formation of either predominantly stratiform or predominantly cumuliform clouds is dependent upon the

- 1—temperature of the air being lifted.
- 2—source of lift.
- 3—percent of moisture content of the air being lifted.
- 4—stability of the air being lifted.

3211. The conditions necessary for the formation of cumulonimbus clouds are a lifting action and

- 1—stable, dry air.
- 2—unstable, dry air.
- 3—unstable, moist air.
- 4—stable, moist air.

3212. At approximately what altitude above the surface would you expect the base of cumuliform clouds if the surface air temperature is 77° F and the dewpoint is 55° F?

- 1—5,000 feet AGL.
- 2—6,000 feet AGL.
- 3—7,300 feet AGL.
- 4—8,800 feet AGL.

3213. At approximately what altitude above the surface would you expect the base of cumuliform clouds if the surface air temperature is 30° C and the dewpoint is 15° C?

- 1—3,409 feet AGL.
- 2—5,000 feet AGL.
- 3—6,000 feet AGL.
- 4—9,409 feet AGL.

3214. The airport elevation is 1,294 feet MSL. At what elevation above mean sea level would you expect cumuliform clouds if the surface air temperature is 26° C and the dewpoint is 21° C?

- 1—706 feet MSL.
- 2—2,000 feet MSL.
- 3—3,136 feet MSL.
- 4—3,294 feet MSL.

3215. The height of the bases of the middle clouds in the middle latitudes range from

- 1—the surface to 8,500 feet.
- 2—1,000 feet to 10,000 feet.
- 3—6,500 feet to 23,000 feet.
- 4—16,500 feet to 45,000 feet.

3216. Which middle level clouds are characterized by billowing tops and comparatively high bases that indicate mid-level instability, turbulence, and icing?

- 1—Altostratus fractus.
- 2—Cumulonimbus mammatus.
- 3—Altostratus castellanus.
- 4—Altostratus lenticular.

3217. Consider the following air mass characteristics:

- A. Smooth air (above the friction level) and poor visibility.
- B. Turbulence up to about 10,000 feet and good visibility, except in areas of precipitation.
- C. Cumuliform clouds.
- D. Stratiform clouds and fog.
- E. Stable lapse rate.
- F. Unstable lapse rate.

Select from the statements above those which are true.

- 1—A, D, and E.
- 2—B, D, and E.
- 3—B, C, and F.
- 4—A, D, and F.

3218. The weather condition normally associated with unstable air is

- 1—fair to poor visibility.
- 2—good visibility, except in blowing sand or snow.
- 3—stratiform clouds.
- 4—continuous precipitation.

3219. Which condition is most likely to exist within a stable air mass?

- 1—Good visibility at the surface.
- 2—Moderate to severe turbulence in low levels.
- 3—Smoke, dust, haze, etc., concentrated in lower levels with resulting poor visibility.
- 4—Towering cumulus and cumulonimbus clouds.

3220. One weather phenomenon which will always occur when flying across a front is

- 1—a change in the wind direction.
- 2—a large precipitation area, if the frontal surface is steep.
- 3—a large temperature change, especially at high altitudes.
- 4—the presence of clouds, either ahead of or behind the front.

3221. A moist, unstable air mass is characterized by

- 1—cumuliform clouds and showery precipitation.
- 2—poor visibility and smooth air.
- 3—stratiform clouds and continuous precipitation.
- 4—fog and drizzle.

3222. Which of the following is a characteristic of stable air?

- 1—Showery-type precipitation.
- 2—Cumuliform clouds.
- 3—Excellent visibility.
- 4—Restricted visibility.

3223. What type weather can one expect from moist, unstable air and very warm surface temperature?

- 1—Continuous heavy precipitation.
- 2—Smooth air, cloudless skies.
- 3—Fog and low stratus clouds.
- 4—Strong updrafts and cumulonimbus clouds.

3224. Which of the following is a characteristic typical of a stable air mass?

- 1—Turbulent air.
- 2—Cumuliform clouds.
- 3—Continuous precipitation.
- 4—Showery precipitation.

3225. A moist, warm air mass that is being cooled from below is characterized, in part, by

- 1—smooth air.
- 2—good visibility.
- 3—cumuliform clouds.
- 4—showers and thunderstorms.

3226. Frontal waves normally form on

- 1—stationary or occluded fronts.
- 2—rapidly-moving cold fronts or warm fronts.
- 3—slow-moving warm fronts or occluded fronts.
- 4—slow-moving cold fronts or stationary fronts.

3227. Name a characteristic of an advancing warm front that has moist, stable air.

- 1—Turbulent air; cumuliform clouds.
- 2—Smooth air; stratiform clouds.
- 3—Fast movement; intermittent precipitation.
- 4—Fast movement; continuous precipitation.

3228. Which of the following types of clouds would indicate areas of convective turbulence?

- 1—Towering cumulus clouds.
- 2—Cirrus clouds.
- 3—Standing lenticular altocumulus clouds.
- 4—Nimbostratus clouds.

3229. Consider the following statements about mountain waves:

- A. Mountain waves always develop in a series on the upwind (windward) side of mountain ridges.
- B. In a mountain wave, the air dips sharply downward immediately to the lee side of a ridge, before rising and falling in a wave motion for a considerable distance downstream.
- C. If the air is humid and the wave is of large amplitude, lenticular (lens-shaped) clouds mark the wave's crest.
- D. In a typical wave, the greatest amplitude is seldom more than 1,000 feet above the ridge crest elevation.

Select from the statements above those which are true.

- 1—B, C.
- 2—A, B, C.
- 3—A, C, D.
- 4—A, B, C, D.

3230. In strong wind conditions, flight over a mountainous area within close proximity to the peaks may be hazardous because of

- 1—violent downdrafts on the windward side.
- 2—violent downdrafts on the leeward side.
- 3—strong turbulence associated with stratus clouds.
- 4—wind shear on the windward side.

3231. When flying low over hilly terrain, ridges, or mountain ranges the greatest potential danger from turbulent air currents will usually be encountered on the

- 1—windward side when flying with the wind.
- 2—leeward side when flying with the wind.
- 3—leeward side when flying into the wind.
- 4—windward side when flying into the wind.

3232. If a strong temperature inversion is encountered immediately after takeoff or during an approach to a landing, a potential hazard exists because of turbulence created by

- 1—cold air over-riding calm, warm air.
- 2—strong convective currents.
- 3—strong surface winds.
- 4—wind shear.

3233. Low-level wind shear, which results in a sudden change of wind direction, may occur

- 1—after a warm front has passed.
- 2—when surface winds are light and variable.
- 3—when surface winds are 15 knots and there is no change in wind direction and windspeed with height.
- 4—when there is a low-level temperature inversion with strong winds above the inversion.

3234. Low-level wind shear is best described as

- 1—deflection of wind currents as the result of Coriolis force.
- 2—a downward motion of the air associated with continuous winds blowing with an easterly component due to the rotation of the Earth.
- 3—a change in wind direction and/or speed within a very short distance in the atmosphere.
- 4—a violently rotating column of air extending from a cumulonimbus cloud.

3235. Low-level wind shear occurs

- 1—when surface winds are 15 knots and there is no change in wind direction and windspeed with height.
- 2—after a warm front has passed.
- 3—when there is a low-level temperature inversion with strong winds above the inversion.
- 4—when surface winds are light and variable.

3236. Which situation would most likely result in freezing rain?

- 1—Rain falling from air which has a temperature of 32° F or less into air having a temperature of more than 32° F.
- 2—Rain falling from air which has a temperature of 0° C or less into air having a temperature of 0° C or more.
- 3—Rain which has a supercooled temperature of 0° C or less falling into air having a temperature of more than 0° C.
- 4—Rain falling from air which has a temperature of more than 32° F into air having a temperature of 32° F or less.

3237. The most rapid accumulation of clear ice on an aircraft in flight may occur with temperatures between 0° C to -15° C in

- 1—ice fog.
- 2—any clouds or dry snow.
- 3—cumuliform clouds.
- 4—stratiform clouds.

3238. Which is an operational consideration regarding aircraft structural icing?

- 1—It is unnecessary for an aircraft to fly through rain or cloud droplets for structural ice to form.
- 2—Clear ice is most likely to form on an airplane when flying through stratified clouds or light drizzle.
- 3—In order for structural ice to form, the temperature at the point where moisture strikes the aircraft must be 0° C (32° F) or colder.
- 4—Rime ice gradually freezes on an airplane's surface becoming a smooth sheet of solid ice.

3239. What are the minimum requirements for the formation of a thunderstorm?

- 1—Sufficient moisture and a lifting action.
- 2—A cumulus cloud with a stable lapse rate.
- 3—Sufficient moisture, an unstable lapse rate, and lifting action.
- 4—Towering cumulus clouds, sufficient moisture, and a frontal zone.

3240. Select the true statement pertaining to the life cycle of a thunderstorm.

- 1—The beginning of rain at the Earth's surface indicates the mature stage of the thunderstorm.
- 2—The beginning of rain at the Earth's surface indicates the dissipating stage of the thunderstorm.
- 3—Updrafts continue to develop throughout the dissipating stage of a thunderstorm.
- 4—The initial stage of a thunderstorm is always indicated by the development of a nimbus cloud.

3241. Which type of clouds produces thunderstorms?

- 1—Nimbostratus.
- 2—Altostratus.
- 3—Cumulonimbus.
- 4—Stratocumulus.

3242. The most severe weather conditions, such as destructive winds, heavy hail, and tornadoes, are generally associated with

- 1—fast-moving warm fronts.
- 2—slow-moving cold fronts.
- 3—slow-moving warm fronts.
- 4—squall line and steady-state thunderstorms.

3243. Tornadoes are most likely to occur with which type of thunderstorms?

- 1—Squall line thunderstorms that form ahead of warm fronts.
- 2—Tropical thunderstorms during the mature stage.
- 3—Steady-state thunderstorms associated with cold fronts or squall lines.
- 4—Air mass thunderstorms.

3244. A squall line is usually associated with

- 1—a fast-moving cold front.
- 2—a fast-moving warm front.
- 3—a stationary front.
- 4—an occluded front.

3245. Consider the following statements with relation to hail as an in-flight hazard to aircraft, and select those which are correct.

- A. There is a useful correlation between the external visual appearance of thunderstorms and the amount of hail within them.
- B. Large hail is most commonly found in thunderstorms which have strong updrafts and large liquid water content.
- C. Hail may be found at any level within a thunderstorm, but not in the clear air outside of the storm cloud.
- D. Hail is usually produced during the mature stage of the thunderstorm's lifespan.
- E. Hailstones may be thrown upward and outward from a storm cloud for several miles.

The true statements are:

- 1—B, D, E.
- 2—A, B, C.
- 3—A, B, C, D, E.
- 4—A, B, D, E.

3246. Which statement is true concerning the in-flight hazard of hail?

- 1—Large hailstones are entirely composed of clear ice.
- 2—Tropical and subtropical thunderstorms contain more hail than thunderstorms in northern latitudes.
- 3—Hailstones may be thrown outward from a storm cloud for several miles.
- 4—Hail is usually produced by altocumulus clouds.

3247. Hail, an in-flight hazard, is most likely to be associated with

- 1—cirrocumulus clouds.
- 2—stratocumulus clouds.
- 3—cumulonimbus clouds.
- 4—cumulus clouds.

3248. Hail will most likely be encountered

- 1—above the cumulonimbus cloud well above the freezing level.
- 2—upwind from the cumulonimbus cloud.
- 3—beneath the anvil cloud of a large cumulonimbus.
- 4—during the dissipating stage of the cumulonimbus.

3249. One condition necessary for the formation of fog is

- 1—high relative humidity.
- 2—calm air.
- 3—visible moisture.
- 4—relative low pressure.

3250. Radiation fog is most likely to occur with which of the following conditions?

- 1—Warm, moist air being forced upslope by light winds resulting in the air being cooled and condensed.
- 2—Low temperature/dewpoint spread, calm wind conditions, the presence of hygroscopic nuclei, low overcast, and favorable topography.
- 3—High humidity during the early evening, cool cloudless night with light winds, and favorable topography.
- 4—Warm, moist air flowing over a cold surface with an 8 to 10 knot wind causing mixing and condensation.

3251. Advection fog is formed as a result of

- 1—moist air moving over a colder surface.
- 2—the ground cooling adjacent air to the dewpoint temperature on clear, calm nights.
- 3—the addition of moisture to a mass of cold air as it moves over a body of water.
- 4—moist, unstable air being cooled as it is forced up a sloping land surface.

3252. If a high-pressure area stagnates over an industrial area, a pilot can expect

- 1—gusty surface winds.
- 2—scattered showers and excellent surface visibility.
- 3—clear sky with excellent surface and flight visibility.
- 4—poor surface visibility with little chance of improvement.

3253. With respect to advection fog, which statement is true?

- 1—It forms almost exclusively at night or near daybreak.
- 2—It forms when unstable air is cooled adiabatically.
- 3—It is slow to develop, and dissipates quite rapidly.
- 4—It can appear suddenly during day or night, and it is more persistent than radiation fog.

3254. Which in-flight hazard is most commonly associated with warm fronts?

- 1—Precipitation-induced fog.
- 2—Ground fog.
- 3—Advection fog.
- 4—Radiation fog.

3255. In reference to clear air turbulence (CAT), areas to be avoided are those where horizontal wind shear exceeds

- 1—6 knots per 1,000 feet.
- 2—10 knots per 50 miles.
- 3—40 knots per 150 miles.
- 4—3 knots per 1,000 feet.

3256. A thermal column is rising from an asphalt parking lot and the wind is from the south at 12 knots. Which statement would be true?

- 1—The slowest rate of sink would be close to the thermal and the fastest rate of sink farther from it.
- 2—As altitude is gained, the center of the thermal will be found farther north of the parking lot.
- 3—As altitude is gained, the best lift will be found directly above the parking lot.
- 4—The best lift will be found several thousand feet directly beneath another glider working that thermal.

3257. Which statement is true regarding the effect of fronts on soaring conditions?

- 1—Good soaring conditions usually exist after passage of a warm front.
- 2—Frequently the air behind a cold front provides excellent soaring for several days.
- 3—Excellent soaring conditions usually exist in the cold air ahead of a warm front.
- 4—A slow moving front provides the strongest lift.

3258. Convective circulation patterns associated with sea breezes are caused by

- 1—warm and less dense air moving inland from over the water, causing it to rise.
- 2—water absorbing and radiating heat faster than the land.
- 3—land absorbing and radiating heat faster than the water.
- 4—cool and less dense air moving inland from over the water, causing it to rise.

3259. One of the most dangerous features of mountain waves is the turbulent areas in and

- 1—above lenticular clouds.
- 2—below lenticular clouds.
- 3—below rotor clouds.
- 4—above rotor clouds.

3260. The conditions most favorable to wave formation over mountainous areas are a layer of

- 1—stable air at mountaintop altitude and a wind of at least 20 MPH blowing across the ridge.
- 2—unstable air at mountaintop altitude and a wind of at least 20 MPH blowing across the ridge.
- 3—either stable or unstable air at mountaintop altitude and a wind of at least 30 MPH blowing parallel to the ridge.
- 4—moist, unstable air at mountaintop altitude and a wind of less than 5 MPH blowing across the ridge.

3261. When soaring in the vicinity of mountain ranges, the greatest potential danger from vertical and rotor-type currents will usually be encountered on the

- 1—windward side when flying with the wind.
- 2—leeward side when flying with the wind.
- 3—leeward side when flying into the wind.
- 4—windward side when flying into the wind.

3262. One method for locating thermals is to

- 1—fly an ever increasing circular path.
- 2—maintain a straight track downwind.
- 3—look for converging streamers of dust or smoke.
- 4—look for diverging streamers of dust or smoke.

3263. An important precaution when soaring in a dust devil is to

- 1—avoid the eye of the vortex because of extreme turbulence.
- 2—avoid the clear area at the outside edge of the dust because of severe downdrafts.
- 3—maintain the same direction as the rotation of the vortex for maximum lift.
- 4—avoid steep turns on the upwind side to prevent being blown into the vortex.

3264. One of the best visual indications of a thermal is

- 1—a fragmented cumulus cloud with a concave base.
- 2—a smooth cumulus cloud with a concave base.
- 3—a broken to overcast sky with cumulus clouds.
- 4—clouds forming at the base of a temperature inversion.

3265. The most favorable type thermals for cross-country soaring may be found

- 1—just ahead of a warm front.
- 2—along thermal streets.
- 3—under mountain waves.
- 4—over altocumulus clouds.

3266. Under what condition can enough lift be found for soaring under stable weather conditions?

- 1—Over steep escarpments or cliffs.
- 2—In mountain waves that form on the upwind side of the mountains.
- 3—Over isolated peaks when strong winds are present.
- 4—On the upwind side of hills or ridges with moderate winds present.

3267. (Refer to figure 2.) Using the sounding taken at 0900 from 2,500 feet to 15,000 feet, as shown on the Pseudo-Adiabatic Chart, what minimum surface temperature is required for instability to occur and for good thermals to develop from the surface to 15,000 feet MSL?

- 1—90° F.
- 2—58° F.
- 3—68° F.
- 4—80° F.

3268. (Refer to figure 2.) At the 0900 sounding and the line plotted from the surface to 10,000 feet, what temperature must exist at the surface for instability to take place between these altitudes?

- 1—Any temperature less than 68° F.
- 2—Any temperature more than 68° F.
- 3—Any temperature less than 43° F.
- 4—Any temperature between 43° F and 68° F.

3269. (Refer to figure 2.) According to the soundings taken at 1400, is the atmosphere stable or unstable and at what altitudes?

- 1—Stable from 10,000 to 13,000 feet.
- 2—Unstable from 10,000 to 13,000 feet.
- 3—Stable from 6,000 to 10,000 feet.
- 4—Neutrally stable from 2,500 to 6,000 feet.

3270. (Refer to figure 2.) Using the 1400 soundings, does an inversion exist, and if so at what altitudes?

- 1—Yes, between 2,500 and 6,000 feet.
- 2—No, there is no inversion shown.
- 3—Yes, between 10,000 and 13,000 feet.
- 4—Yes, between 13,000 and 15,000 feet.

3271. (Refer to figure 3.) Which station is reporting the wind as calm?

- 1—FTW.
- 2—DAL.
- 3—DFW.
- 4—TYR.

3272. (Refer to figure 3.) In the report for TYR, what does the F2 mean?

- 1—Tower visibility is reported as 2 miles.
- 2—The altimeter setting has fallen .2 inch in the last hour.
- 3—The runway visual range is 2,000 feet.
- 4—Two-tenths of the sky is obscured by fog.

3273. (Refer to figure 3.) What is the reported duration of the rain at the time of the observation at AUS?

- 1—36 minutes.
- 2—34 minutes.
- 3—26 minutes.
- 4—25 minutes.

3274. (Refer to figure 3.) What does the LB26E40 mean at the end of the report for AMA?

- 1—The wind in the vicinity of rain showers was estimated at 26 to 40 knots.
- 2—Lightning began at 1726 with 40 percent coverage of radar echos.
- 3—There are large buildups to the east with wind gusting 26 to 40 knots.
- 4—Drizzle began at 26 past the hour and ended at 40 past the hour.

3275. (Refer to figure 3.) Which station is reporting the lowest visibility?

- 1—AUS.
- 2—TYR.
- 3—ABI.
- 4—FTW.

3273. (Refer to figure 3.) The altimeter setting at AUS is

- 1—1016.9 mb.
- 2—1208.0 mb.
- 3—30.05" Hg.
- 4—31.69" Hg.

3277. GIVEN:

RADAT 91M024085105/1.

The relative humidity was 91 percent at

- 1—all levels.
- 2—2,400 feet MSL.
- 3—8,500 feet MSL.
- 4—10,500 feet MSL.

3278. GIVEN:

RADAT 88M018055097/2.

How many crossings of the zero degree Celsius isotherm has occurred?

- 1—3.
- 2—4.
- 3—5.
- 4—6.

3279. GIVEN:

OUN AMOS 36/26/3618/007 PK WIND 27 024.

The 024 indicates

- 1—24 hundredths of an inch of liquid precipitation since the last observation.
- 2—a drop of 24 hundredths of an inch of mercury in the altimeter setting in the last hour.
- 3—the peak wind occurred 24 minutes past the hour.
- 4—2.4 inches of precipitation has accumulated in the last 24 hours.

3280. Interpret the following radar weather report:

LIT 1133 AREA 4TRW 22/100 88/170 196/180 220/115
C2425 MT 310 AT 162/110

- 1—The maximum top of the cells is located 162° and 110 NM from the station (LIT).
- 2—There are four cells with tops at 10,000 feet, 17,000 feet, and 11,500 feet.
- 3—The cells are moving in a direction of 162° at 10 knots.
- 4—The visibility is 4 miles in thunderstorms and the intensity of thunderstorms remains unchanged.

3281. Which statement is true concerning this radar weather report for OKC?

OKC 1934 LN 8TRW / 86/ 40 164/60 199/115 15W 2425
MT 570 AT 159/65 2 INCH HAIL RPRTD THIS ECHO.

- 1—The visibility is 8 miles in rain showers.
- 2—The line of cells is moving 080° with winds reported up to 40 knots.
- 3—There are three cells with tops at 11,500, 40,000, and 60,000 feet.
- 4—The maximum top of the cells is 57,000 feet located 65 NM south-southeast of the station.

3282. Radar weather reports are of special interest to pilots because they report

- 1—large areas of low ceilings and fog.
- 2—location of precipitation along with type, intensity, and trend.
- 3—location of broken to overcast clouds.
- 4—icing conditions.

3283. (Refer to figure 4.) Which is a true statement?

- 1—The pilot reported a north wind at 30 knots at BRO.
- 2—There are moderate buildups west of ABI.
- 3—It is clear above 8,500 at DAL.
- 4—The visibility at ABI is 15 miles.

3284. (Refer to figure 4.) Turbulence was reported west of

- 1—DAL.
- 2—ABI.
- 3—AUS.
- 4—BRO.

3285. (Refer to figure 4.) Which is the true statement?

- 1—Moderate turbulence was reported by a pilot east of ABI.
- 2—Rime ice was reported west of AUS below 9,000 feet.
- 3—The base of the overcast at AUS was reported to be 13,000 feet.
- 4—Thunderstorms were reported north of BRO.

3286. (Refer to figure 4.) The lowest cloud base reported is

- 1—4,500 feet at DAL.
- 2—5,000 feet at BRO.
- 3—1,300 feet at AUS.
- 4—500 feet at BRO.

3287. (Refer to figure 5.) What is the visibility forecast for BRO?

- 1—4 miles.
- 2—1 mile.
- 3—3 miles.
- 4—Greater than 6 miles.

3288. (Refer to figure 5.) What type of weather can be expected after 0400Z at DAL?

- 1—At least a ceiling of 1,000 feet and visibility of 3 miles.
- 2—Ceiling of more than 3,000 feet and visibility greater than 5 miles.
- 3—Ceiling less than 1,000 feet and visibility less than 3 miles.
- 4—Ceiling greater than 5,000 feet and visibility greater than 5 miles.

3289. (Refer to figure 5.) What is the lowest ceiling forecast for AUS?

- 1—500 feet.
- 2—1,400 feet.
- 3—200 feet.
- 4—2,000 feet.

3290. (Refer to figure 5.) Which of the stations are forecasting the wind to be less than 6 knots for the entire forecast period?

- 1—ABI.
- 2—ACT.
- 3—BRO.
- 4—AUS and ACT.

3291. (Refer to figure 5.) The valid time for the forecasts is from

- 1—1000Z on the 30th until 1000Z on the following day.
- 2—0940Z on the 30th until 0940Z the following day.
- 3—1000Z on the 30th until 2200Z on the 30th.
- 4—1010Z on the 30th until 1000Z the following day.

3292. To determine the freezing level and areas of probable icing aloft, you should refer to the

- 1—Radar Summary Chart.
- 2—Weather Depiction Chart.
- 3—Area Forecast.
- 4—Surface Analysis Weather Map.

3293. For a brief summary of the location and movement of fronts, pressure systems, and circulation patterns, the pilot should refer to the

- 1—Terminal Forecast.
- 2—Radar Summary Chart.
- 3—Stability Chart.
- 4—Area Forecast.

3294. What is the meaning of the term MVFR, as used in the categorical outlook portion of terminal and area forecasts?

- 1—A ceiling of 1,000 to 3,000 feet, and/or visibility of 3 to 5 miles.
- 2—A ceiling less than 1,000 feet, and/or visibility less than 3 miles.
- 3—A ceiling of 3,000 to 5,000 feet, and visibility of 5 to 7 miles.
- 4—A ceiling less than 1,000 feet, and/or visibility less than 1 mile.

3295. An area forecast is valid for

- 1—18 hours with an additional 12 hours categorical outlook.
- 2—12 hours with an additional 12 hours categorical outlook.
- 3—12 hours with an additional 6 hours categorical outlook.
- 4—6 hours with an additional 6 hours categorical outlook.

3296. (Refer to figure 6.) What is the forecast for northwestern Alabama after 2300Z?

- 1—I-FR with widely scattered thunderstorms.
- 2—Ceilings below 1,000 feet and visibility restricted to 3 miles by light rain and fog.
- 3—Ceilings of 1,000 to 3,000 feet and/or visibility of 3 to 5 miles with possible rain showers.
- 4—Ceilings greater than 3,000 feet and visibility more than 5 miles.

3297. (Refer to figure 6.) The forecast is valid for:

- 1—24 hours with an additional 12-hour outlook.
- 2—18 hours with an additional 12-hour outlook.
- 3—12 hours with an additional 6-hour outlook.
- 4—6 hours with an additional 6-hour outlook.

3298. (Refer to figure 6.) What is the forecast visibility for south-central Texas for the period ending 2300Z?

- 1—This visibility is not forecast.
- 2—Less than 3 miles.
- 3—More than 6 miles.
- 4—At least 5 miles.

3299. (Refer to figure 6.) The lowest layer of clouds forecast for Oklahoma is

- 1—1,200 feet MSL.
- 2—below 1,000 feet AGL.
- 3—100 feet AGL.
- 4—below 1,000 feet MSL.

3300. What information would be covered in an AIRMET?

- 1—Embedded thunderstorms.
- 2—Hail of 3/4 inch or greater diameter.
- 3—Severe turbulence.
- 4—Extensive mountain obscurement.

3301. Which in-flight advisory would contain information on severe icing?

- 1—Convective SIGMET.
- 2—SIGMET.
- 3—AIRMET.
- 4—PIREP.

3302. What information is contained in a convective SIGMET in the conterminous United States?

- 1—Tornadoes, embedded thunderstorms, and hail 3/4 inch or greater in diameter.
- 2—Severe icing, severe turbulence, or widespread dust storms lowering visibility to less than 3 miles.
- 3—Weather less than basic VFR and sustained winds of 30 knots or greater at the surface.
- 4—Moderate thunderstorms and surface winds greater than 40 knots.

3303. (Refer to figure 7.) What is the temperature for 6,000 feet at AMA?

- 1—The temperature is standard for that altitude.
- 2—4° C.
- 3—8° C.
- 4—No temperatures are forecast for levels within 2,500 feet of station elevation.

3304. (Refer to figure 7.) Why is there no wind forecast for 3,000 and 6,000 feet at ABQ?

- 1—No winds are forecast within 1,500 feet of station elevation.
- 2—Winds less than 10 knots are omitted from the forecast.
- 3—No winds are forecast within 3,000 feet of station elevation.
- 4—Wind which is expected to be light and variable is omitted.

3305. (Refer to figure 7.) What is the forecast wind for 12,000 feet at AMA?

- 1—Calm.
- 2—090° at 9 knots.
- 3—090° in excess of 50 knots.
- 4—Light and variable.

3306. (Refer to figure 7.) What is the temperature at 30,000 feet for DAL?

- 1— +40° C.
- 2— -40° C.
- 3— +40° F.
- 4— -40° F.

3307. (Refer to figure 7.) What is the forecast wind at 6,000 feet for ABI?

- 1—140° at 11 knots.
- 2—010° at 40 knots.
- 3—140° at 9 knots.
- 4—014° at 9 knots.

3308. (Refer to figure 7.) What is the forecast wind at 34,000 feet for ICT?

- 1—150° at 40 knots.
- 2—250° at 40 knots.
- 3—075° at 40 knots.
- 4—015° at 140 knots.

3309. By referring to the isobars on a Surface Analysis (weather map), what can a person determine?

- 1—Areas of magnetic variation.
- 2—Areas of precipitation.
- 3—Pressure gradient.
- 4—Temperature changes.

3310. The intensity trend of a front (as of map time) is best determined by referring to a

- 1—Radar Summary Chart.
- 2—Surface Analysis.
- 3—Constant Pressure Chart.
- 4—Weather Depiction Chart.

3311. Which of the following symbols used on a Surface Analysis Weather Map represents a stationary front?

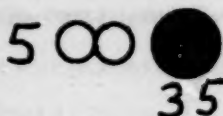


3312. What does this symbol mean on a Surface Analysis (weather map)?



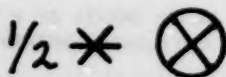
- 1—Cold front aloft.
- 2—Occluded front.
- 3—High-pressure ridge.
- 4—Squall line.

3313. On a Weather Depiction Chart, what does this information mean?



- 1—Visibility 5 miles, haze, overcast, ceiling 3,500 feet.
- 2—Visibility 3.5 miles, sky obscured, lowest layer of clouds 5,000 feet.
- 3—Visibility 3 to 5 miles, sky obscured, ceiling 5,000 feet.
- 4—Visibility 5 miles, sky obscured.

3314. On a Weather Depiction Chart, what does this information mean?



- 1—Visibility unlimited, sky overcast, base of clouds variable 100 to 200 feet, wind calm.
- 2—Visibility 1/2 mile, snow, sky partially obscured.
- 3—Visibility 1 to 2 miles, blowing sand, sky overcast.
- 4—Visibility less than 1 mile, blowing dust, sky broken clouds.

3315. On a Weather Depiction Chart, what weather conditions would be contained in an unshaded area that is enclosed by a smooth line?

- 1—Ceiling greater than 3,000 feet and/or visibility greater than 5 miles.
- 2—Ceiling between 5,000 and 7,000 feet and/or visibility greater than 5 miles.
- 3—Ceiling less than 1,000 feet and/or visibility less than 3 miles.
- 4—Ceiling between 1,000 and 3,000 feet and/or visibility between 3 and 5 miles.

3316. A Weather Depiction Chart is useful to a pilot in determining

- 1—areas of equal barometric pressure.
- 2—the temperature and dewpoint at selected stations.
- 3—the forecast areas of cloud cover and precipitation.
- 4—areas where weather conditions were reported above or below VFR minimums.

3317. The Weather Depiction Chart in figure 8 indicates that the coastal sections of Texas and Louisiana are reporting

- 1—ceilings of 250 feet with patchy ground fog.
- 2—all ceilings at or above 20,000 feet with visibilities of 20 miles or more.
- 3—marginal VFR conditions due to broken ceilings of 2,000 feet.
- 4—VFR conditions with scattered clouds at 2,000 feet and higher cirroform.

3318. The Weather Depiction Chart in figure 8 indicates the heaviest precipitation along the front is occurring in

- 1—Oklahoma.
- 2—Missouri.
- 3—Illinois.
- 4—Kansas.

3319. The Weather Depiction Chart in figure 8 indicates that northern Illinois and southern Wisconsin are reporting

- 1—marginal VFR conditions due to reduced visibility in drizzle and fog.
- 2—low IFR conditions due to ceilings below 500 feet with drizzle.
- 3—IFR conditions due to overcast ceilings less than 1,000 feet with reduced visibilities in rain and rain showers.
- 4—VFR ceilings but reduced visibilities due to fog and haze.

3320. The Weather Depiction Chart in figure 8 indicates that most of Virginia is reporting

- 1—marginal VFR conditions due to extensive low ceilings.
- 2—marginal VFR conditions due to reduced visibilities in fog and haze.
- 3—IFR conditions due to very low visibilities and frontal buildups.
- 4—continuous rain and rain showers due to warm air advection.

3321. (Refer to figure 8.) What restrictions to visibility are depicted in western Iowa?

- 1—Fog and haze.
- 2—Fog, rain, and haze.
- 3—Drizzle, fog, and rain.
- 4—Drizzle.

3322. (Refer to figure 9.) What is the direction and speed of movement of the line that extends from southwestern Nebraska to east central Minnesota?

- 1—Northeast at 50 knots.
- 2—North at 41 knots.
- 3—Southeast at 22 knots.
- 4—Northeast at 30 knots.

3323. (Refer to figure 9.) What is the VIP level of Area A?

- 1—1.
- 2—2.
- 3—3.
- 4—5.

3324. (Refer to figure 9.) What does the 280 in Area C mean?

- 1—The highest top of precipitation is 28,000 feet MSL.
- 2—Coverage of precipitation is 28.0 percent.
- 3—That cell is moving east at 28 knots.
- 4—The base of the clouds is 2,800 feet MSL.

3325. (Refer to figure 9.) What is the VIP level of the black area in Area F?

- 1—0-No echo.
- 2—3.
- 3—4.
- 4—6.

3326. (Refer to figure 9.) The minus sign next to the TRW symbol in area D means

- 1—intensity increasing.
- 2—intensity decreasing.
- 3—no change in intensity.
- 4—no echo.

3327. A Radar Summary Chart helps a pilot in planning a safe flight because it graphically displays a collection of radar reports concerning

- 1—fog and other obscurations.
- 2—the intensity and movement of precipitation.
- 3—clouds and in-flight visibilities.
- 4—clouds and ceiling heights.

3328. What information is provided by the Radar Summary Chart?

- 1—Areas of clear weather.
- 2—Lines, cells, and areas of hazardous thunderstorms.
- 3—Ceilings and precipitation between reporting stations.
- 4—Areas of cloud cover and fog.

3329. (Refer to figure 10.) Which area(s) should have the lowest ceilings at 1800Z?

- 1—The area just ahead of the cold front.
- 2—About 150 miles ahead and along the cold front.
- 3—The area extending from northern Kansas to western Wisconsin.
- 4—The areas where precipitation is expected to occur, east of the cold front and west of the warm front.

3330. (Refer to figure 10.) Where is snow expected at 1800Z?

- 1—From northwest Kansas to the Great Lakes and from northwest Colorado northward to Canada.
- 2—Immediately behind and ahead of the cold front.
- 3—Northern Oregon and Washington.
- 4—In the central Great Lakes area.

3331. (Refer to figure 10.) What type precipitation is expected in eastern Arkansas at 1800Z?

- 1—Rain showers and thunderstorms affecting .5 or more of the area.
- 2—Rain showers over the entire area.
- 3—Continuous rain in .5 or more of the area.
- 4—Continuous rain over the entire area.

3332. (Refer to figure 10.) At what altitude is the freezing level in central Oklahoma as forecast on the 24-hour significant weather prog?

- 1—4,000 feet MSL.
- 2—5,000 feet MSL.
- 3—6,000 feet MSL.
- 4—8,000 feet MSL.

3333. (Refer to figure 10.) At what altitude is the freezing level in central Oklahoma as forecast on the 12-hour significant weather prog?

- 1—On the surface.
- 2—800 feet AGL.
- 3—4,000 feet MSL.
- 4—8,000 feet MSL.

3334. Which weather chart depicts the conditions forecast to exist at a specific time in the future?

- 1—Surface Analysis.
- 2—Prognostic.
- 3—Weather Depiction.
- 4—Radar Summary.

3335. Which is an operational consideration concerning U.S. Low Level Significant Weather Prognostic Charts?

- 1—This is a four-panel chart that forecasts the weather for a period of 48 hours.
- 2—The valid time of the charts corresponds to the time of the plotted observations and they are not forecasts.
- 3—The charts are designed for use in domestic flight planning to 24,000 feet.
- 4—These charts do not depict ceiling, visibility, or turbulence.

3336. (Refer to figure 11.) This High Level Significant Weather Prognostic Chart encompasses airspace from

- 1—10,000 feet MSL to 51,000 feet MSL.
- 2—20,000 feet MSL to FL610.
- 3—FL240 to FL630.
- 4—FL250 to 70,000 feet MSL.

3337. (Refer to figure 11.) The 340 in a rectangle, at Area A, means the forecast

- 1—height of the tropopause in millibars.
- 2—height of the strongest winds in hundreds of feet above sea level.
- 3—highest altitude for turbulence in that area.
- 4—height of the tropopause in hundreds of feet MSL.

3338. (Refer to figure 11.) What is the type and intensity of the forecast turbulence in Area B?

- 1—Convective turbulence, light to moderate in intensity.
- 2—Clear air turbulence, moderate to severe in intensity.
- 3—Convective turbulence, severe to extreme in intensity.
- 4—Clear air turbulence, light to severe in intensity.

3339. (Refer to figure 11.) What is the forecast extent of the turbulence in Area C?

- 1—From below FL240 to FL320.
- 2—From the surface to 32,000 feet MSL.
- 3—From 10,000 feet MSL to FL360.
- 4—From FL180 to 36,000 feet MSL.

3340. (Refer to figure 11.) What is the forecast coverage of thunderstorms in Area D?

- 1—Less than 1/8.
- 2—1/8 to 4/8.
- 3—5/8 to 8/8.
- 4—1/2 or less.

3341. (Refer to figure 11.) In Area F, what is the significance of the numbers 510 over the 3 X's?

- 1—Turbulence is forecast to be moderate and greater from the surface to FL510.
- 2—Cloud bases are forecast to be below FL240 and the tops are forecast to reach FL510.
- 3—Turbulence is forecast to be severe from 24,000 feet MSL to 51,000 feet MSL.
- 4—Cloud bases are forecast to be from 18,000 feet MSL to 51,000 feet MSL.

3342. (Refer to figure 12.) What percent coverage of severe thunderstorms is forecast to occur in the area of moderate risk in the north central United States?

- 1—Less than 10 percent.
- 2—6 to 10 percent.
- 3—10 to 50 percent.
- 4—50 to 90 percent.

3343. If an area on a Severe Weather Outlook Chart is labeled APCHG, this indicates

- 1—winds greater than or equal to 35 knots but less than 50 knots.
- 2—thunderstorm activity may approach extreme intensity.
- 3—possible tornadoes.
- 4—hail greater than 3/4 inch in diameter but less than 1-1/4 inch.

3344. (Refer to figure 12.) A crosshatched area on the Severe Weather Outlook Chart indicates a

- 1—forecast severe thunderstorm watch area.
- 2—severe weather outlook area.
- 3—forecast weather watch.
- 4—current tornado watch area.

3345. (Refer to figure 13.) What are the probable weather conditions in the area indicated by Arrow B on the Stability Chart?

- 1—Neutral stability; showery precipitation.
- 2—Low humidity; high scattered cumuliform clouds.
- 3—Stable air; stratified cloudiness and steady precipitation.
- 4—Moderate humidity and unstable air; scattered shower activity.

3346. (Refer to figure 13.) What are the probable weather conditions in the area indicated by Arrow C on the Stability Chart?

- 1—Low relative humidity; limited cumulus activity.
- 2—Unstable air; instability, showers, and thunderstorms.
- 3—Neutral stability; stratus clouds and light precipitation.
- 4—Moderately saturated air; steady precipitation and light turbulence.

3347. (Refer to figure 13.) What are the probable weather conditions in the area indicated by Arrow D on the Stability Chart?

- 1—Marginally unstable air; moderate turbulence and possible thunderstorms.
- 2—Negative stability; cumuliform clouds and scattered shower activity.
- 3—High relative humidity; showers and thunderstorms.
- 4—Stable air; predominately fair.

3348. (Refer to figure 13.) Which symbol on the Stability Chart signifies very stable air and no precipitation?

- 1— $\frac{23}{-15}$
- 2— $\frac{-3}{34}$
- 3— $\frac{-5}{17}$
- 4— $\frac{0}{35}$

3349. From which of the following can the observed temperature, wind, and temperature/dewpoint spread be determined at specified flight levels?

- 1—Winds Aloft Forecasts.
- 2—Significant Weather Prognostic Charts.
- 3—Constant Pressure Charts.
- 4—Stability Charts.

3350. When using a Constant Pressure Chart for planning a flight at 10,000 feet MSL, to which of the following should the pilot refer?

- 1—850-millibar chart.
- 2—700-millibar chart.
- 3—500-millibar chart.
- 4—200-millibar chart.

3351. Notification to the NTSB is required when there has been any damage

- 1—caused by collision with another aircraft on the ground.
- 2—to an engine caused by engine failure in flight.
- 3—which adversely affects structural strength or flight characteristics.
- 4—which requires repairs to landing gear or flaps.

3352. The NTSB defines a serious injury as any injury which requires hospitalization for more than

- 1—72 hours.
- 2—48 hours.
- 3—36 hours.
- 4—12 hours.

3353. If an aircraft is involved in an accident which resulted in substantial damage to the aircraft, the nearest NTSB field office should be notified

- 1—immediately.
- 2—within 5 days.
- 3—within 7 days.
- 4—within 10 days.

3354. NTSB Part 830 requires an immediate notification as a result of which incident?

- 1—Any required flight crewmember being unable to perform flight duties because of illness.
- 2—Engine failure for any reason during flight.
- 3—Damage to the landing gear as a result of a hard landing.
- 4—Generator failure in flight which results in the loss of the electrical system.

3355. The operator of an aircraft that has been involved in an accident is required to file an accident report within how many days?

- 1—3.
- 2—5.
- 3—7.
- 4—10.

3356. The operator of an aircraft that has been involved in an accident is required to submit a report to the nearest field office of the NTSB

- 1—within 3 days.
- 2—within 7 days.
- 3—within 10 days.
- 4—only if requested to do so.

3357. What document(s) must you have in your personal possession while operating as pilot in command of an aircraft?

- 1—A certificate showing accomplishment of a current flight review.
- 2—A certificate showing accomplishment of a checkout in the aircraft and a current flight review.
- 3—A pilot logbook with endorsements showing accomplishment of a current flight review and recency of experience.
- 4—An appropriate pilot certificate and a current medical certificate.

3358. A person whose flight instructor certificate has been suspended may not

- 1—give flight instruction for compensation, but may recommend students for certification.
- 2—apply for any rating to be added to that certificate during the period of suspension.
- 3—give flight instruction, but may apply for a rating to be added to that certificate.
- 4—apply for any flight instructor certificate for a period of 1 year after the date of the suspension.

3359. What is the duration of a Student Pilot Certificate?

- 1—Indefinite.
- 2—12 calendar months.
- 3—24 calendar months.
- 4—36 calendar months.

3360. What is the duration of a Flight Instructor Certificate?

- 1—Indefinitely, unless suspended or revoked.
- 2—24 calendar months.
- 3—Indefinitely, as long as the holder has a current pilot and medical certificate appropriate to the pilot privileges being exercised.
- 4—12 calendar months.

3361. If a Second-Class Medical Certificate was issued to a commercial pilot 13 months ago, during the next 11 months this pilot may

- 1—act as pilot in command and carry passengers or property, but not for compensation or hire.
- 2—act as pilot in command for compensation or hire, and carry passengers or property for compensation or hire.
- 3—not act as pilot in command nor carry passengers or property.
- 4—act as pilot in command for compensation or hire, but may not carry passengers or property for compensation or hire.

3362. A Third-Class Medical Certificate was issued on May 3, this year. To exercise the privileges of a Private Pilot Certificate, the medical certificate will be valid through

- 1—May 31, 1 year later.
- 2—May 31, 2 years later.
- 3—May 3, 1 year later.
- 4—May 3, 2 years later.

3363. According to FAR's, a Second-Class Medical Certificate issued January 18 of this year will

- 1—expire January 18 of the next year.
- 2—expire for commercial pilot privileges January 31, 2 years later.
- 3—be issued without a specific expiration date if there are no limitations that would affect the safe operation of an aircraft.
- 4—expire January 31 of the next year for commercial pilot privileges, but may be used for private pilot privileges until January 31, 2 years later.

3364. To act as pilot in command of an airplane that has more than 200 horsepower, a person is required to do which of the following, if no pilot-in-command time in a high-performance airplane was logged prior to November 1, 1973?

- 1—Make three solo takeoffs and landings in such an airplane.
- 2—Receive flight instruction in an airplane that has more than 200 horsepower.
- 3—Pass a flight test in such an airplane.
- 4—Hold a 200-horsepower class rating.

3365. Unless otherwise authorized, a pilot in command is required to possess a type rating for that aircraft when operating any

- 1—airplane with a gross weight in excess of 6,000 pounds.
- 2—multiengine airplane with a gross weight in excess of 6,000 pounds.
- 3—airplane with a gross weight in excess of 12,500 pounds.
- 4—aircraft that requires more than one pilot.

3366. To act as pilot in command of an airplane that is equipped with a retractable landing gear, a person is required to do which of the following, if no pilot-in-command time in such an airplane was logged prior to November 1, 1973?

- 1—Receive flight instruction in such an airplane and obtain a logbook endorsement of competency.
- 2—Hold a retractable-gear airplane class rating.
- 3—Make at least three solo takeoffs and landings in such an airplane.
- 4—Pass an FAA flight test in such an airplane.

3367. To be eligible (in part) to take an FAA airman certification written test, an applicant must show proof of

- 1—enrollment in an approved course of training.
- 2—meeting the minimum age requirement for the issuance of the certificate being sought.
- 3—medical qualification appropriate to the certificate being sought.
- 4—satisfactory completion of a ground instruction or home study course.

3368. A person who has cheated or committed any unauthorized act during a written test may not take any written test within

- 1—90 days.
- 2—6 months.
- 3—1 year.
- 4—2 years.

3369. What action may be taken against a person who has cheated on a written test?

- 1—That person may be required to wait a maximum of 6 months before taking any written test.
- 2—That person may be required to wait a maximum of 90 days before taking any written test.
- 3—That person may be required to wait 24 months before taking any written test.
- 4—Any airman certificate or rating held may be suspended or revoked.

3370. To be eligible for a flight test, an applicant is required to have passed the appropriate written test within the preceding.

- 1—12 calendar months.
- 2—18 calendar months.
- 3—24 calendar months.
- 4—36 calendar months.

3371. What class medical certificate, if any, is required for a person adding a rating to a pilot certificate?

- 1—None.
- 2—First-Class.
- 3—Second-Class.
- 4—Third-Class.

3372. A written statement from an appropriately rated flight instructor certifying that an applicant has received the required instruction in preparation for a flight test must be dated within a minimum of how many days preceding the date of application?

- 1—60 days.
- 2—90 days.
- 3—120 days.
- 4—180 days.

3373. An applicant has failed a pilot written test for the second time. That applicant may apply for a retest after how many days?

- 1—5.
- 2—7.
- 3—10.
- 4—30.

3374. An applicant who fails a pilot flight test for the second time may apply for a retest after

- 1—receiving 5 hours of dual instruction.
- 2—7 days have passed.
- 3—presenting a letter of competency to the examiner.
- 4—30 days have passed.

3375. Which instruction time must be certified by the instructor from whom it was received?

- 1—Flight instruction only.
- 2—Ground instruction only.
- 3—Flight instruction, pilot ground trainer instruction, and ground instruction.
- 4—Flight instruction and ground trainer instruction only.

3376. What flight time must be shown, in a reliable record, by a pilot exercising the privileges of a commercial certificate?

- 1—All additional flight time.
- 2—All flight time flown with passengers aboard the aircraft.
- 3—Only the flight time necessary to meet the recent experience requirements.
- 4—Only the additional flight instruction time received.

3377. A flight instructor who has not satisfactorily accomplished a biennial flight review or passed a required proficiency check within the prescribed time is

- 1—authorized to fly solo only.
- 2—authorized to act as pilot in command, but not for compensation.
- 3—not authorized to fly solo.
- 4—not authorized to give instruction except to holders of Private Pilot Certificates.

3378. To serve as second in command of large airplanes, a person must hold at least

- 1—a Private Pilot Certificate with appropriate category and class ratings.
- 2—a Private Pilot Certificate with the appropriate category, class, and type ratings.
- 3—a Commercial Pilot Certificate, an appropriate instrument rating, and be type certificated in the airplane.
- 4—an Airline Transport Pilot Certificate with the appropriate category, class, and type ratings.

3379. If recency of experience requirements for night flight are not met and official sunset is 1830, the latest time passengers may be carried is

- 1—1730.
- 2—1830.
- 3—1900.
- 4—1930.

3380. What recent flight experience must be met before a commercial airplane pilot may fly solo in an airplane?

- 1—Three takeoffs and three landings within the preceding 90 days in an airplane.
- 2—Three takeoffs and three landings within the preceding 90 days in any fixed-wing aircraft.
- 3—Satisfactorily accomplished a flight review in any aircraft for which rated, within the preceding 24 calendar months.
- 4—Satisfactorily accomplished a flight review within the preceding 24 calendar months, but this review must be in an airplane.

3381. To meet the recent flight experience requirements for acting as pilot in command carrying passengers at night, a pilot must have made, within the preceding 90 days and from 1 hour after sunset to 1 hour before sunrise, three takeoffs and three landings to a full stop in

- 1—the same category of aircraft to be used.
- 2—the same category and class of aircraft to be used.
- 3—the same category class, and, if a type rating is required, the same type of aircraft to be used.
- 4—any aircraft in which the pilot is rated.

3382. A private pilot has completed three takeoffs and three landings to a full stop within the preceding 90 days in a tricycle-gear airplane, single-engine land, and decides to take a passenger for a flight in a conventional-gear airplane, single-engine land. Since these aircraft are of the same category and class the pilot is

- 1—current in both airplanes.
- 2—not current in either airplane.
- 3—current in the conventional-gear airplane.
- 4—current in the tricycle-gear airplane.

3383. The holder of a pilot certificate who fails to notify the FAA Airmen Certification Branch of a change of permanent mailing address may exercise the privileges of that pilot certificate for how many days after the date of change?

- 1—60 days.
- 2—30 days.
- 3—14 days.
- 4—7 days.

3384. A person seeking a private pilot glider rating is exempt from taking the written examination if that person

- 1—has taken a written examination for any powered rating within the preceding 12 months.
- 2—has taken a written examination for any powered rating within the preceding 24 months.
- 3—holds a pilot certificate for any category.
- 4—holds a rating for powered aircraft.

3385. A private pilot with an airplane single-engine land rating may act as pilot in command of an airplane towing a glider, if within the preceding 12 months, this pilot has

- 1—made at least six flights as pilot in command of an airplane towing a glider.
- 2—made actual or simulated glider tows.
- 3—logged takeoffs and landings in a powered glider.
- 4—made three flights as pilot in command of a glider towed by an aircraft.

3386. To be eligible for a Student Pilot Certificate limited to airplanes, an applicant is required to be at least how old?

- 1—16 years.
- 2—17 years.
- 3—18 years.
- 4—19 years.

3387. An applicant who is seeking a Student Pilot Certificate limited to helicopters is required to be at least how old?

- 1—16 years.
- 2—17 years.
- 3—18 years.
- 4—19 years.

3388. What is the minimum age requirement for the applicant who is seeking a Student Pilot Certificate limited to gyroplane operations?

- 1—14 years.
- 2—16 years.
- 3—17 years.
- 4—18 years.

3389. The minimum age requirement for the applicant who is seeking a Student Pilot Certificate limited to glider operations is

- 1—14 years.
- 2—15 years.
- 3—16 years.
- 4—17 years.

3390. Prior to solo, a student must have received flight and ground instruction in

- 1—night flying, including takeoffs, landings, and VFR navigation.
- 2—crosswind takeoffs and landings.
- 3—airport traffic patterns, including collision avoidance precautions and wake turbulence.
- 4—flight maneuvering by reference to ground objects.

3391. Which is a required endorsement by an authorized flight instructor for a student pilot to operate an aircraft in solo flight?

- 1—An endorsement made within the preceding 180 days that instruction was given in the make of aircraft to be soloed and that the instructor found the applicant competent to make a safe flight in that aircraft.
- 2—An endorsement must have been made on the Student Pilot Certificate within the preceding 6 months.
- 3—An endorsement that instruction was given in the make and model of aircraft to be soloed within the preceding 6 months.
- 4—An endorsement within the preceding 90 days stating that instruction was given in the make and model and the student is competent to fly that aircraft solo.

3392. Prior to a first solo flight, the flight instructor is required to endorse the student's

- 1—logbook and pilot certificate.
- 2—logbook only.
- 3—medical certificate and pilot certificate.
- 4—pilot certificate only.

3393. A student is required to have his/her pilot certificate endorsed by a flight instructor for each

- 1—solo flight.
- 2—solo cross-country flight.
- 3—make and model of aircraft to be flown solo.
- 4—passenger flight.

3394. A student pilot who wishes solo privileges in a certain make and model aircraft is required to first

- 1—pass a written test about that aircraft.
- 2—get a flight instructor endorsement for that aircraft.
- 3—receive at least 5 hours of dual instruction in that aircraft.
- 4—receive at least one dual cross-country flight in that aircraft.

3395. A student pilot with no cross-country training may practice solo takeoffs and landings at an airport within what maximum distance from the departure airport?

- 1—10 NM.
- 2—15 NM.
- 3—25 NM.
- 4—50 NM.

3396. A student pilot whose pilot certificate is not endorsed by a flight instructor to make solo cross-country flights is prohibited from flying solo beyond what distance from the point of takeoff?

- 1—15 NM.
- 2—20 NM.
- 3—25 NM.
- 4—50 NM.

3397. Are students authorized to make repeated solo cross-country flights without each flight being logbook endorsed?

- 1—No. Each solo cross-country flight requires a logbook endorsement.
- 2—Yes. Solo cross-country flights require no logbook endorsement.
- 3—Yes, but only if the flights remain within 25 NM of the point of departure.
- 4—Yes, provided the flights take place under stipulated conditions.

3398. One requirement for a student pilot to be authorized to make a solo cross-country flight is an endorsement

- 1—on the Student Pilot Certificate stating the student is competent to make cross-country flights in the category, class, and type of aircraft involved.
- 2—in the student's logbook stating the instructor has given the student dual instruction over the route to be flown.
- 3—in the student's logbook that the preflight planning and preparation has been reviewed and the student is prepared to make the flight safely.
- 4—in the student's logbook that the instructor has given the student cross-country instruction in the model of aircraft to be used.

3399. May repeated solo cross-country flights over the same route be made by a student without receiving an endorsement from a flight instructor for each flight?

- 1—No; an endorsement is required for each solo cross-country flight.
- 2—Yes; if the route is no more than 50 NM from the point of departure and instruction was given in both directions over the route.
- 3—Yes; if the total route is no more than 25 NM from the point of departure and the student has received at least 3 hours of cross-country instruction and logged at least 5 hours of solo cross-country flight.
- 4—Yes; but the distance from the departure point is limited to 100 NM.

3400. What is the minimum age required to be eligible for a Private Pilot Certificate with an airplane rating?

- 1—14.
- 2—16.
- 3—17.
- 4—18.

3401. To be eligible for a Private Pilot Certificate, one of the requirements is for the applicant to hold at least a current

- 1—Fourth-Class Medical Certificate.
- 2—Third-Class Medical Certificate.
- 3—Second-Class Medical Certificate.
- 4—First-Class Medical Certificate.

3402. What night flight instruction is required for an unrestricted Private Pilot Certificate with an airplane rating

- 1—1 hour at night, including three takeoffs and three landings.
- 2—1 hour at night, including five takeoffs and five landings.
- 3—3 hours at night, including 10 takeoffs and 10 landings.
- 4—5 hours at night, including five takeoffs and five landings.

3403. With respect to cross-country experience requirements of FAR Part 61, a private pilot airplane applicant must have a minimum of

- 1—3 hours dual and 5 hours solo.
- 2—3 hours dual and 10 hours solo.
- 3—5 hours dual and 5 hours solo.
- 4—5 hours dual and 10 hours solo.

3404. To act as pilot in command of an airplane in a passenger-carrying airlift sponsored by a charitable organization, a private pilot is required to have

- 1—special authorization from FAA.
- 2—logged at least 200 hours of flight time.
- 3—at least 100 hours of pilot-in-command time.
- 4—an instrument pilot rating, if the flight extends beyond a 25-mile radius.

3405. What flight time is required for a Private Pilot Certificate with a helicopter rating?

- 1—A minimum of 40 hours of flight instruction and solo flight time in aircraft with at least 15 hours of solo time in helicopters.
- 2—A minimum of 40 hours of flight time in aircraft with at least 15 hours of flight instruction in helicopters.
- 3—A minimum of 40 hours in helicopters with at least 15 hours of solo time.
- 4—A minimum of 40 hours of flight time with at least 10 hours of solo time in helicopters.

3406. How much solo time in a gyroplane is required to be eligible for a Private Pilot Certificate with a gyroplane rating?

- 1—5 hours.
- 2—10 hours.
- 3—15 hours.
- 4—20 hours.

3407. What is the minimum age required to be eligible for a Commercial Pilot Certificate?

- 1—16.
- 2—17.
- 3—18.
- 4—21.

3408. To be eligible for a Commercial Pilot Certificate, one of the requirements is for the applicant to hold at least a current

- 1—First-Class Medical Certificate.
- 2—Second-Class Medical Certificate.
- 3—Third-Class Medical Certificate.
- 4—Fourth-Class Medical Certificate.

3409. As a pilot, how much flight time should an applicant have for a Commercial Pilot Certificate with an airplane rating?

- 1—250 hours.
- 2—200 hours.
- 3—150 hours.
- 4—100 hours.

3410. Under FAR Part 61, a commercial pilot-airplane applicant is required to have a minimum of how much cross-country experience?

- 1—20 hours.
- 2—30 hours.
- 3—40 hours.
- 4—50 hours.

3411. What limitation is imposed on a newly certificated commercial airplane pilot if that person does not hold an instrument pilot rating?

- 1—That person is limited to private pilot privileges.
- 2—The carrying of passengers or property for hire on cross-country flights is limited to 50 NM and the carrying of passengers for hire at night is prohibited.
- 3—The carrying of passengers for hire on cross-country flights is limited to 50 NM and the carrying of passengers for hire at night is prohibited.
- 4—The carrying of passengers for hire on cross-country flights is limited to 50 NM for night flights, but not limited for day flights.

3412. As pilot, how much flight time should an applicant have for a Commercial Pilot Certificate with a helicopter rating?

- 1—250 hours.
- 2—200 hours.
- 3—150 hours.
- 4—100 hours.

3413. As pilot, how much flight time should an applicant have for a Commercial Pilot Certificate with a gyroplane rating?

- 1—250 hours.
- 2—200 hours.
- 3—150 hours.
- 4—100 hours.

3414. An applicant for a Commercial Pilot Certificate with a glider rating must have at least

- 1—25 hours pilot time, 20 hours in gliders and 100 glider flights as pilot in command, including 25 flights in which 360° turns were made.
- 2—200 hours of pilot time in heavier-than-air aircraft, including at least 10 glider flights as pilot in command during which 360° turns were made.
- 3—40 hours of flight time in gliders and single-engine airplanes, including 10 solo glider flights.
- 4—35 glider flights launched by ground tow or 20 launched by aerotow.

3415. What requirement must a certified flight instructor meet in order to prepare an applicant for a flight instructor rating?

- 1—A minimum of 100 hours of flight instructor time.
- 2—Have held a Flight Instructor Certificate for at least 12 months.
- 3—Have held a Flight Instructor Certificate for at least 24 months and given a minimum of 200 hours of flight instruction.
- 4—Have held a Flight Instructor Certificate for at least 24 months and given a minimum of 500 hours of flight instruction.

3416. What requirement must a certified glider flight instructor meet in order to prepare an applicant for a flight instructor glider rating?

- 1—Have held a Flight Instructor Certificate for at least 24 months and given a minimum of 80 hours of instruction.
- 2—Have held a Flight Instructor Certificate for 24 months or have given 200 hours of flight instruction.
- 3—A minimum of 200 hours as a flight instructor.
- 4—Have held a Flight Instructor Certificate for 12 months and given a minimum of 80 hours of instruction.

3417. The type and date of each student pilot endorsement given shall be maintained by each flight instructor. For what period of time is this record required to be maintained?

- 1—6 months.
- 2—12 months.
- 3—24 months.
- 4—36 months.

3418. A flight instructor who applies for an additional rating on that certificate must have a minimum of how many hours as pilot in command in the category and class of aircraft appropriate to the rating sought?

- 1—20 hours.
- 2—15 hours.
- 3—10 hours.
- 4—5 hours.

3419. During any 24 consecutive hours, an instructor is limited to how many hours of flight instruction?

- 1—6 hours.
- 2—8 hours.
- 3—10 hours.
- 4—12 hours.

3420. To endorse a student pilot for solo cross-country privileges, an instructor is required, in part, to have

- 1—at least 5 hours of experience as pilot in command in the aircraft involved.
- 2—given at least 200 hours of flight instruction.
- 3—given that student the required cross-country flight instruction.
- 4—assurance from another instructor that the student is prepared to conduct the flight safely.

3421. To endorse a student pilot's logbook for local solo flight, an instructor is required, in part to have

- 1—given that student flight instruction in the type of aircraft involved.
- 2—given at least 200 hours of flight instruction.
- 3—at least 5 hours of experience as pilot in command in the aircraft involved.
- 4—given that student cross-country flight instruction.

3422. To authorize a student to make a local solo flight, the instructor is required, in part, to

- 1—have at least 5 hours of experience as pilot in command in the aircraft involved.
- 2—have given that student cross-country flight instruction.
- 3—first give that student at least 3 hours of instrument training.
- 4—endorse the student's pilot certificate for solo in the make and model aircraft to be flown.

3423. Certain flight instruction is required for the issuance of a certificate. If that instruction is in a multiengine airplane, the instructor is required, in part, to have

- 1—at least 5 hours of experience as pilot in command in the make and model of aircraft involved.
- 2—given at least 200 hours of flight instruction.
- 3—held a flight instructor certificate during the date of instruction.
- 4—given at least 3 hours of instrument training in the airplane involved.

3424. The minimum pilot-in-command time requirement for a flight instructor with multiengine privileges to give instruction to a student for a multiengine rating, is

- 1—15 hours in multiengine aircraft.
- 2—10 hours in the make of aircraft in which the instruction is to be given.
- 3—15 hours in the make and model of aircraft in which instruction is to be given.
- 4—5 hours in the make and model of aircraft in which instruction is to be given.

3425. The holder of an expired Flight Instructor Certificate may exchange that certificate for a new one by

- 1—passing the appropriate oral test.
- 2—presenting a satisfactory record of instruction.
- 3—successfully completing a flight instructor refresher course.
- 4—passing the appropriate practical test.

3426. If an in-flight emergency requires immediate action, a pilot in command may

- 1—deviate from FAR's to the extent required to meet the emergency, but must submit a written report to the Administrator within 24 hours.
- 2—not deviate from FAR's unless prior to the deviation approval is granted by the Administrator.
- 3—deviate from FAR's to the extent required to meet that emergency.
- 4—not deviate from FAR's unless permission is obtained from air traffic control.

3427. In addition to other preflight action for a VFR cross-country flight, regulations specifically require the pilot in command to

- 1—check the accuracy of the omninavigational equipment if the flight is to be made on airways.
- 2—determine runway lengths at the airports of intended use.
- 3—check each fuel tank visually to ensure that it is always filled to capacity.
- 4—file a flight plan for the proposed flight.

3428. Which preflight action is required for every flight?

- 1—Check weather reports and forecasts.
- 2—Determine runway length at airports of intended use.
- 3—Determine alternatives if the flight cannot be completed.
- 4—Check for any known traffic delays.

3429. The preflight action required by regulations relative to alternatives available if the planned flight cannot be completed, is applicable to

- 1—IFR flights only.
- 2—any flight conducted for hire or compensation.
- 3—any flight not in the vicinity of an airport.
- 4—all IFR and night VFR flights.

3430. Which statement is true regarding the fastening of seatbelts?

- 1—All persons on board must have their seatbelts fastened during the entire flight.
- 2—Seatbelts must be fastened about passengers during takeoff and landing only, while required flight crewmembers' seatbelts must be fastened during the entire flight.
- 3—Seatbelts must be fastened about passengers and required crewmembers during takeoff and landing only.
- 4—Seatbelts must be fastened about passengers during takeoff and landing only, while each required crewmember's seatbelt must be fastened at all times while occupying an assigned station.

3431. Under what condition, if any, may a pilot allow a person who is obviously under the influence of intoxicating liquors or drugs to be carried aboard an aircraft?

- 1—Under no condition.
- 2—Only if the person is a medical patient under proper care or in an emergency.
- 3—Only if the person does not have access to the cockpit or pilot's compartment.
- 4—Only if a second pilot is aboard.

3432. A person may not act as a crewmember of a civil aircraft if alcoholic beverages have been consumed by that person within the preceding

- 1—8 hours.
- 2—12 hours.
- 3—24 hours.
- 4—48 hours.

3433. No person may act as a crewmember of a civil aircraft with a minimum blood alcohol level of

- 1—1.0 percent or greater.
- 2—.04 percent or greater.
- 3—0.2 percent or greater.
- 4—any detectable amount.

3434. When must each occupant of an aircraft wear an approved parachute?

- 1—When an aircraft is being tested after major repair.
- 2—When flying over water beyond gliding distance to the shore.
- 3—When a door is removed from the aircraft to facilitate parachute jumpers.
- 4—When an intentional bank that exceeds 60° is to be made.

3435. A chair-type (canopy in back) parachute (made entirely of synthetic material) is carried in an aircraft and is available for emergency use. Regulations require that this parachute must have been packed by an appropriately rated parachute rigger within the preceding

- 1—60 days.
- 2—90 days.
- 3—120 days.
- 4—180 days.

3436. Which of the following is required to operate an aircraft towing an advertising banner?

- 1—Approval from ATC to operate in a control area.
- 2—A record of training in towing for the pilot in command.
- 3—A safety link at each end of the towline which has a breaking strength not less than 80 percent of the aircraft's gross weight.
- 4—A certificate of waiver issued by the Administrator.

3437. Portable electronic devices which may cause interference with the navigation or communication system may not be operated on aircraft being flown

- 1—in commercial operations.
- 2—at altitudes above 14,500 feet MSL.
- 3—within the United States.
- 4—along Federal airways.

3438. A pilot in a multiengine land airplane is planning to practice IFR procedures under a hood. The safety pilot must have at least a

- 1—Student Pilot Certificate.
- 2—Private Pilot Certificate, airplane single-engine land rating.
- 3—Private Pilot Certificate, airplane multiengine land rating.
- 4—Private Pilot Certificate, airplane single-engine land and multiengine land ratings.

3439. What is the minimum fuel requirement for flight under VFR at night in an airplane? Enough to fly to

- 1—the first point of intended landing.
- 2—the first point of intended landing and to fly after that for 20 minutes at normal cruising speed.
- 3—the first point of intended landing and to fly after that for 30 minutes at normal cruising speed.
- 4—the first point of intended landing and to fly after that for 45 minutes at normal cruising speed.

3440. What is the minimum fuel requirement for flight under VFR during daylight hours in an airplane? Enough to fly to

- 1—the first point of intended landing.
- 2—the first point of intended landing and to fly after that for 20 minutes at normal cruising speed.
- 3—the first point of intended landing and to fly after that for 30 minutes at normal cruising speed.
- 4—the first point of intended landing and to fly after that for 45 minutes at normal cruising speed.

3441. What is the minimum fuel requirement for flight under VFR in a rotorcraft? Enough to fly to

- 1—the first point of intended landing.
- 2—the first point of intended landing and to fly after that for 20 minutes at normal cruising speed.
- 3—the first point of intended landing and to fly after that for 30 minutes at normal cruising speed.
- 4—the first point of intended landing and to fly after that for 45 minutes at normal cruising speed.

3442. How long before the proposed operation should a request be submitted to the controlling ATC facility to operate in a TCA without the required 4096 code transponder?

- 1—1 hour.
- 2—4 hours.
- 3—8 hours.
- 4—24 hours.

3443. A coded transponder equipped with altitude reporting equipment is required for all controlled airspace

- 1—except control zones.
- 2—above 12,500 feet MSL (excluding airspace at or below 2,500 feet AGL).
- 3—above 18,000 feet MSL (excluding airspace at or below 1,500 feet AGL).
- 4—below 14,500 feet MSL.

3444. Regarding certificates and documents, no person may operate an aircraft unless it has within it an

- 1—Airworthiness Certificate, aircraft and engine logbooks, and owner's handbook.
- 2—Airworthiness Certificate and owner's handbook.
- 3—Airworthiness Certificate, Registration Certificate, and operating limitations.
- 4—Airworthiness Certificate, and aircraft and engine logbooks.

3445. An aircraft's operating limitations may be found

- 1—on the Airworthiness Certificate.
- 2—in the aircraft flight manual, approved manual material, markings, and placards, or any combination thereof.
- 3—only in the FAA approved aircraft flight manual.
- 4—only in the owner's handbook published by the aircraft manufacturer.

3446. Unless each occupant is provided with supplemental oxygen, no person may operate a civil aircraft of U.S. registry above a cabin pressure altitude of

- 1—15,000 feet MSL.
- 2—14,000 feet MSL.
- 3—12,500 feet MSL.
- 4—10,000 feet MSL.

3447. If a pressurized airplane is not equipped with a quick-donning type oxygen mask, one pilot at the controls must wear and use an oxygen mask when operating above which flight level?

- 1—FL180.
- 2—FL250.
- 3—FL300.
- 4—FL350.

3448. At which of these cabin pressure altitudes may a pilot operate an aircraft in excess of 30 minutes without supplemental oxygen?

- 1—15,500 feet MSL.
- 2—15,000 feet MSL.
- 3—14,500 feet MSL.
- 4—12,500 feet MSL.

3449. If an unpressurized aircraft is operated above 12,500 feet MSL, but not more than 14,000 feet MSL, for a period of 2 hours 20 minutes, how long during that time is the minimum flightcrew required to use supplemental oxygen?

- 1—2 hours 20 minutes.
- 2—1 hour 20 minutes.
- 3—1 hour 50 minutes.
- 4—Supplemental oxygen is not required.

3450. Which is required equipment for powered aircraft during VFR night flights?

- 1—Gyroscopic bank and pitch indicator.
- 2—Gyroscopic direction indicator.
- 3—Appropriate radio navigational equipment.
- 4—Anticollision light system.

3451. When conducting VFR operations at night for hire, the aircraft must be equipped with at least

- 1—a sensitive altimeter.
- 2—one electric landing light.
- 3—an attitude indicator.
- 4—a flashing strobe on the vertical fin.

3452. No person may operate an aircraft that has an experimental certificate

- 1—in a congested airway.
- 2—in a control zone.
- 3—carrying passengers or property.
- 4—over sparsely populated areas.

3453. Which of the following aircraft requires an altitude alerting system or device when being operated?

- 1—All turbojet-powered airplanes.
- 2—All turbine-powered aircraft.
- 3—All airplanes with a gross weight of more than 12,500 pounds.
- 4—All transport-type airplanes.

3454. When are emergency locator transmitter batteries required to be replaced or recharged?

- 1—After 1 cumulative hour of use.
- 2—After 20 cumulative minutes of use.
- 3—After 100 cumulative hours of use.
- 4—Every 6 months.

3455. What is the maximum distance from an airport that an airplane engaged in training operations may be operated without an emergency locator transmitter?

- 1—10 NM.
- 2—25 NM.
- 3—50 NM.
- 4—75 NM.

3456. The expiration date for batteries used in emergency locator transmitters must be legibly marked

- 1—on the Airworthiness Certificate.
- 2—in the maintenance record.
- 3—on the inside of the transmitter case.
- 4—on the instrument panel.

3457. May an airplane be operated in formation flight while passengers are carried for hire?

- 1—No, this is not authorized.
- 2—Yes, if the passengers approve.
- 3—Yes, provided arrangements have been made with the other pilot(s).
- 4—Yes, if operating outside controlled airspace.

3458. If on a night flight, the pilot of airplane A observes only the green wingtip light of airplane B, and the airplanes are converging, which airplane has the right-of-way?

- 1—Airplane B; it is to the right of airplane A.
- 2—Airplane A; it is to the right of airplane B.
- 3—Airplane B; it is to the left of airplane A.
- 4—Airplane A; it is to the left of airplane B.

3459. When two or more airplanes are approaching an airport for the purpose of landing, the right-of-way belongs to the airplane

- 1—that has the other to its right.
- 2—that is the least maneuverable.
- 3—that is either ahead of or to the other's right regardless of altitude.
- 4—at the lower altitude, but it shall not take advantage of this rule to cut in front of or to overtake another.

3460. What action should be taken if a glider and an airplane approach each other at the same altitude and on a head-on collision course?

- 1—The airplane should give way because the glider has the right-of-way.
- 2—The airplane should give way because it is more maneuverable.
- 3—Both should give way to the right.
- 4—The airplane should climb and the glider should descend so as to pass each other by at least 500 feet.

3461. The maximum indicated airspeed permitted when operating a reciprocating engine aircraft within an Airport Traffic Area located outside a Terminal Control Area is

- 1—156 knots.
- 2—180 knots.
- 3—200 knots.
- 4—230 knots.

3462. When flying beneath the lateral limits of a Terminal Control Area, the maximum speed authorized is

- 1—250 knots.
- 2—200 knots.
- 3—180 knots.
- 4—156 knots.

3463. Unless otherwise authorized, what is the maximum speed at which a turbine-powered aircraft should be flown within an Airport Traffic Area which is in a Terminal Control Area?

- 1—156 knots.
- 2—188 knots.
- 3—200 knots.
- 4—250 knots.

3464. Unless otherwise authorized or required by air traffic control, what is the maximum indicated airspeed at which a person may operate an aircraft below 10,000 feet MSL?

- 1—156 knots.
- 2—180 knots.
- 3—200 knots.
- 4—250 knots.

3465. What is the minimum altitude required for acrobatic flight?

- 1—3,000 feet AGL.
- 2—2,000 feet MSL.
- 3—1,500 feet AGL.
- 4—1,000 feet MSL.

3466. What is the minimum flight visibility required for acrobatic flight?

- 1—5 miles.
- 2—3 miles.
- 3—2 miles.
- 4—1 mile.

3467. According to regulations, which statement is true regarding acrobatic flight or the use of parachutes?

- 1—Parachutes are always required for all occupants of an aircraft when spins are practiced.
- 2—For acrobatic flight, the visibility must be at least 5 miles and the ceiling must be 3,000 feet or more.
- 3—Parachutes are not required when a private pilot carrying a passenger performs a power-on stall in a noseup attitude of 40° relative to the horizon.
- 4—An intentional maneuver, not necessary for normal flight involving an abrupt change in the aircraft's attitude, is considered acrobatic flight.

3468. From sunset to sunrise, no person may park or move an aircraft in a night-flight operations area of an airport unless the aircraft

- 1—is in an area marked by obstruction lights.
- 2—has lighted aviation red or white anticollision lights.
- 3—is equipped with an electric landing or taxi light.
- 4—is operated in a slow, careful manner.

3469. What action, if any, is appropriate if you deviate from an air traffic control instruction during an emergency and are given priority?

- 1—Take no special action since you are pilot in command.
- 2—If requested, file a detailed report within 48 hours to the chief of the air traffic control facility.
- 3—File a report to the FAA Administrator within 48 hours.
- 4—File a report to the chief of that air traffic control facility within 24 hours.

3470. While in flight, a steady red light directed at you from the control tower means

- 1—give way to other aircraft; continue circling.
- 2—return for landing; expect steady green light at the appropriate time.
- 3—continue flight; exercise extreme caution.
- 4—continue flight; airport unsafe, do not land.

3471. While in flight, an alternating red and green light directed at you from the control tower means

- 1—give way to other aircraft; continue circling.
- 2—exercise extreme caution.
- 3—airport unsafe; do not land.
- 4—return for landing; expect steady green light at proper time.

3472. If a flashing red light from the tower is received while holding on a runway for takeoff, the pilot should

- 1—return to the starting point.
- 2—taxi clear of the runway.
- 3—hold the position.
- 4—take off immediately.

3473. You receive a flashing white light from a control tower during the run-up prior to takeoff; what action should you take?

- 1—Proceed, exercising extreme caution.
- 2—Taxi clear of the runway in use.
- 3—Return to your starting point on the airport.
- 4—None; since this light signal is applicable only to aircraft in flight.

3474. To operate an aircraft over any congested area, a pilot should maintain an altitude of at least

- 1—500 feet above the highest obstacle within a horizontal radius of 500 feet.
- 2—500 feet above the highest obstacle within a horizontal radius of 1,000 feet.
- 3—1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet.
- 4—2,000 feet above the highest obstacle within a horizontal radius of 1,000 feet.

3475. The minimum distance at which an airplane may be operated over a structure which is located in a sparsely populated area is

- 1—1,000 feet above the ground.
- 2—1,000 feet from the structure.
- 3—500 feet above the ground.
- 4—500 feet from the structure.

3476. Except when necessary for takeoff or landing, what is the minimum safe altitude for a pilot to operate an aircraft anywhere?

- 1—An altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.
- 2—An altitude of 500 feet above the surface and no closer than 500 feet to any person, vessel, vehicle, or structure.
- 3—An altitude of 500 feet above the highest obstacle within a horizontal radius of 1,000 feet.
- 4—An altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet.

3477. Prior to takeoff, the altimeter should be set to

- 1—the current local altimeter setting, if available, or the departure airport elevation.
- 2—the corrected density altitude of the departure airport.
- 3—the corrected pressure altitude for the departure airport.
- 4—29.92" Hg.

3478. What type airspeed at the planned cruise altitude should be entered on a flight plan?

- 1—Estimated groundspeed.
- 2—Indicated airspeed.
- 3—True airspeed.
- 4—Calibrated airspeed.

3479. A turbine-powered or large airplane is required to enter an Airport Traffic Area at an altitude of at least

- 1—1,000 feet AGL.
- 2—1,500 feet AGL.
- 3—2,000 feet AGL.
- 4—3,000 feet AGL.

3480. An airport without a control tower lies within the Airport Traffic Area of an airport that has an operating tower. According to regulations, air traffic control authorization is required to land at

- 1—the tower-controlled airport only, as well as to fly through the area.
- 2—both airports, as well as to fly through the area.
- 3—both airports, but not required to fly through the area.
- 4—the tower-controlled airport only, but not required to fly through the area.

3481. What is the correct departure procedure at a noncontrolled airport?

- 1—Departure in any direction consistent with safety, after crossing the airport boundary.
- 2—The FAA approved departure procedure for that airport.
- 3—Depart in the same manner as at other airports.
- 4—Make all left turns, except a 45° right turn on the first crosswind leg.

3482. Which statement is true regarding VFR operations in Terminal Control Areas?

- 1—Flight under visual flight rules is not authorized within Terminal Control Areas.
- 2—Solo student pilots may be authorized to fly within Terminal Control Areas, if they meet certain stipulations.
- 3—When operating within Terminal Control Areas, VOR receivers are not required.
- 4—A flight plan is required to be filed prior to operating within a Terminal Control Area.

3483. Which statement is true concerning the requirements for flight within a Terminal Control Area?

- 1—Distance measuring equipment is required.
- 2—At least a Commercial Pilot Certificate is required.
- 3—Automatic altitude alerting system is required.
- 4—A 4096 code transponder with Mode C capability.

3484. Which equipment is required when operating an airplane within a Terminal Control Area?

- 1—A 4096 code transponder.
- 2—A 4096 code transponder with Mode C capability.
- 3—A VOR receiver with distance measuring equipment.
- 4—An automatic direction finder.

3485. In which type of airspace are VFR flights prohibited?

- 1—Terminal Control Area.
- 2—Continental Control Area.
- 3—control zone.
- 4—Positive Control Area.

3486. During VFR operations outside controlled airspace at altitudes of less than 1,200 feet AGL, what is the minimum distance from clouds requirement?

- 1—Remain clear of clouds.
- 2—500 feet above or 1,000 feet below and 2,000 feet horizontal.
- 3—500 feet above or 500 feet below and 1,000 feet horizontal.
- 4—1,000 feet above or 1,000 feet below and 1,500 feet horizontal.

3487. During operations within controlled airspace at altitudes of more than 1,200 feet AGL, but less than 10,000 feet MSL, the minimum horizontal distance from clouds requirement for VFR flight is

- 1—500 feet.
- 2—1,000 feet.
- 3—1,500 feet.
- 4—2,000 feet.

3488. While in uncontrolled airspace in VFR conditions, what distance from clouds should be maintained when flying more than 1,200 feet AGL, and at or above 10,000 feet MSL?

- 1—500 feet below; 1,000 feet above; 1 mile horizontal.
- 2—1,000 feet below; 500 feet above; 2,000 feet horizontal.
- 3—1,000 feet below; 1,000 feet above; 1 mile horizontal.
- 4—500 feet below; 1,000 feet above; 2,000 feet horizontal.

3489. While in controlled airspace in VFR conditions, what in-flight visibility is required when flying more than 1,200 feet AGL and at or above 10,000 feet MSL?

- 1—5 SM.
- 2—3 SM.
- 3—2 SM.
- 4—1 SM.

3490. While in uncontrolled airspace in VFR conditions, what in-flight visibility is required when flying more than 1,200 feet AGL and less than 10,000 feet MSL?

- 1—5 SM.
- 2—3 SM.
- 3—2 SM.
- 4—1 SM.

3491. When operating an airplane within a control zone under special visual flight rules, the flight visibility is required to be at least

- 1—1 SM.
- 2—2 SM.
- 3—3 SM.
- 4—5 SM.

3492. No person may operate an airplane within a control zone at night under special VFR unless

- 1—the flight can be conducted 500 feet below the clouds.
- 2—an instructor is aboard.
- 3—the airplane is equipped for instrument flight.
- 4—the flight visibility is at least 3 miles.

3493. Regulations stipulate that at an airport located within a control zone and at which ground visibility is not reported, takeoffs and landings of airplanes under special VFR are

- 1—not authorized.
- 2—authorized if the flight visibility is at least 1 SM.
- 3—authorized only if another airport in that control zone reports a ground visibility of 1 SM.
- 4—not restricted by visibility requirements.

3494. When operating under VFR at more than 3,000 feet AGL, cruising altitudes to be maintained are based upon the

- 1—magnetic course being flown.
- 2—true course being flown.
- 3—magnetic heading being flown.
- 4—true heading being flown.

3495. Which of the following courses and altitudes are appropriate for VFR aircraft operating more than 3,000 feet AGL, but below 18,000 feet MSL?

- 1—Magnetic course 180°—359° inclusive, even thousands plus 500 feet.
- 2—True course 0°—179° inclusive, odd thousands plus 500 feet.
- 3—True course 180°—359° inclusive, odd thousands plus 500 feet.
- 4—Magnetic course 0°—179° inclusive, even thousands plus 500 feet.

3496. Completion of an annual inspection and the return of an aircraft to service should always be indicated by

- 1—the relicensing date on the Registration Certificate.
- 2—an appropriate notation in the aircraft maintenance records.
- 3—the results of the inspection described on a Repair and Alteration Form.
- 4—the issuance date of the Airworthiness Certificate.

3497. If an aircraft's operation in flight was substantially affected by an alteration or repair, the aircraft documents must show that it was test flown and approved for return to service by an appropriately rated pilot prior to being operated

- 1—away from the vicinity of the airport.
- 2—with passengers aboard.
- 3—for compensation or hire.
- 4—by any private pilot.

3498. An aircraft operated for hire with passengers aboard has a 100-hour inspection performed after 90 hours in service. The next 100-hour inspection would be due after

- 1—10 hours' time in service.
- 2—90 hours' time in service.
- 3—100 hours' time in service.
- 4—110 hours' time in service.

3499. An aircraft's last annual inspection was performed on July 12, this year. The next annual inspection will be due no later than

- 1—July 31, next year.
- 2—July 13, next year.
- 3—100 flight hours following the last annual inspection.
- 4—12 calendar months after the date shown on the Airworthiness Certificate.

3500. Which of these operations is prohibited if the aircraft being used has not had a 100-hour inspection or annual inspection within the preceding 100 hours of time in service?

- 1—Carrying property for hire.
- 2—Conducting any commercial operation.
- 3—Carrying passengers, either for hire or not for hire.
- 4—Giving flight instruction for hire.

3501. If an ATC transponder installed in an aircraft has not been tested, inspected, and found to comply with regulations within a specified period, what is the limitation on its use?

- 1—It may be used anywhere except in Terminal Control Areas.
- 2—It may be used when outside controlled airspace.
- 3—It may be used for VFR flight but not for IFR flight.
- 4—Its use is not permitted.

3502. What is the maximum time period during which a person may use an ATC transponder after it has been tested and inspected?

- 1—90 days.
- 2—12 calendar months.
- 3—24 calendar months.
- 4—36 calendar months.

3503. In addition to the items required by FAR Part 91, Subpart A, the pilot in command shall ensure that a large airplane has on board

- 1—a vertical speed indicator.
- 2—a cockpit checklist.
- 3—a third attitude indicator.
- 4—one pyrotechnic signaling device for each person.

3504. Unless that airplane is equipped with a life preserver or an approved flotation device for each occupant, no person may take off in a large or turbine-powered multiengine aircraft for a flight over water of more than

- 1—power-off gliding distance from shore.
- 2—30 minutes flying time from the nearest shoreline.
- 3—50 NM from the nearest shoreline.
- 4—100 NM from the nearest shoreline.

3505. The three axes of an aircraft intersect at the

- 1—center of gravity.
- 2—center of pressure.
- 3—midpoint of the datum line.
- 4—midpoint of the mean chord.

3506. The point on an airfoil through which lift acts is the

- 1—midpoint of the chord.
- 2—center of pressure.
- 3—axis of rotation.
- 4—center of gravity.

3507. Lift produced by an airfoil is the net force developed perpendicular to the

- 1—Earth's surface.
- 2—relative wind.
- 3—chord.
- 4—longitudinal axis of the aircraft.

3508. The angle between the chord line of the wing and the longitudinal axis of the airplane is known as

- 1—the angle of attack.
- 2—relative wind.
- 3—the angle of incidence.
- 4—dihedral.

3509. The angle between the chord line of an airfoil and the relative wind is known as the angle of

- 1—attack.
- 2—lift.
- 3—incidence.
- 4—longitudinal dihedral.

3510. A line drawn from the leading edge to the trailing edge of an airfoil and equidistant at all points from the upper and lower contours is called the

- 1—chord line.
- 2—camber line.
- 3—mean curvature line.
- 4—mean camber line.

3511. The force which imparts a change in the velocity of a mass is called

- 1—work.
- 2—thrust.
- 3—power.
- 4—horsepower.

3512. During a steady climb, the rate of climb depends on

- 1—power required.
- 2—thrust available.
- 3—excess power.
- 4—excess thrust.

3513. During a steady climb the angle of climb depends on

- 1—power available
- 2—drag.
- 3—thrust required.
- 4—excess thrust.

3514. As it applies to airfoils, which statement is in agreement with Bernoulli's Principle?

- 1—The speed of a fluid increases at points where the pressure of the fluid increases.
- 2—The pressure of a fluid decreases at points where the speed of the fluid increases.
- 3—The pressure of a fluid increases at points where the speed of the fluid increases.
- 4—The pressure of a fluid decreases at points where the speed of the fluid decreases.

3515. An airplane wing is designed to produce lift resulting from relatively

- 1—positive air pressure below and above the wing's surface.
- 2—negative air pressure below the wing's surface and positive air pressure above the wing's surface.
- 3—positive air pressure below the wing's surface and negative air pressure above the wing's surface.
- 4—negative air pressure below and above the wing's surface.

3516. An increase in the speed at which an airfoil passes through the air increases lift because

- 1—the increased speed of the air passing over the airfoil's upper surface decreases the pressure, thus creating a greater pressure differential between the upper and lower surfaces.
- 2—the increased speed of the airflow creates a lesser pressure differential between the upper and lower airfoil surfaces.
- 3—the increased velocity of the relative wind increases the angle of attack.
- 4—the impact pressure of the air on the lower surface of the airfoil creates less positive pressure.

3517. During flight with zero angle of attack, the pressure along the upper surface of the wing would be

- 1—less than atmospheric pressure.
- 2—equal to atmospheric pressure.
- 3—greater than atmospheric pressure.
- 4—greater than the pressure below the wing.

3518. An airplane would have a tendency to noseup and have an inherent tendency to enter a stalled condition when the center of pressure

- 1—and center of gravity are located in the same place.
- 2—is aft of the center of gravity.
- 3—is below the center of gravity.
- 4—is forward of the center of gravity.

3519. That portion of the aircraft's total drag created by the production of lift is called

- 1—induced drag, and is greatly affected by changes in airspeed.
- 2—parasite drag, and is greatly affected by changes in airspeed.
- 3—induced drag, and is not affected by changes in airspeed.
- 4—profile drag, and is not affected by changes in airspeed.

3520. As airspeed increases in level flight, total drag of the aircraft becomes greater than the total drag produced at the maximum L/D speed because of the

- 1—increase in induced drag.
- 2—increase in parasite drag.
- 3—decrease in parasite drag.
- 4—decrease in induced drag.

3521. As airspeed decreases in level flight, total drag of the aircraft becomes greater than the total drag produced at the maximum L/D speed because of the

- 1—increase in induced drag.
- 2—increase in parasite drag.
- 3—decrease in induced drag.
- 4—decrease in parasite drag.

3522. The resistance, or skin friction, due to the viscosity of the air as it passes along the surface of the wing is called

- 1—profile drag.
- 2—form drag.
- 3—parasite drag.
- 4—interference drag.

3523. Which relationship is correct when comparing drag and airspeed?

- 1—Induced drag increases as the square of the airspeed.
- 2—Profile drag varies inversely as the square of the airspeed.
- 3—Induced drag varies inversely as the square of the airspeed.
- 4—Parasite drag decreases as the square of the airspeed.

3524. Which statement describes the relationship of the forces acting on an aircraft in a constant-power and constant-air-speed descent?

- 1—Thrust is equal to drag; weight is greater than lift.
- 2—Thrust is equal to drag; lift is equal to weight.
- 3—Thrust is greater than drag; weight is greater than lift.
- 4—Thrust is greater than drag; lift is equal to weight.

3525. Which statement is true regarding the forces acting on an aircraft in a steady-state climb?

- 1—The sum of all forward forces is less than the sum of all rearward forces.
- 2—The sum of all forward forces is greater than the sum of all rearward forces.
- 3—The sum of all upward forces is greater than the sum of all downward forces.
- 4—The sum of all upward forces is equal to the sum of all downward forces.

3526. When considering the forces acting upon an airplane in straight-and-level flight at constant airspeed, which statement is correct?

- 1—Drag always acts rearward parallel to relative wind and is less than thrust.
- 2—Thrust always acts forward parallel to the relative wind and is greater than drag.
- 3—Lift always acts perpendicular to the longitudinal axis of the wing and is greater than weight.
- 4—Weight always acts vertically toward the center of the Earth.

3527. As the angle of bank is increased, the vertical component of lift

- 1—decreases and the sink rate increases.
- 2—increases and the sink rate decreases.
- 3—decreases and the sink rate decreases.
- 4—increases and the sink rate increases.

3528. What force causes the aircraft to turn in flight?

- 1—Horizontal component of lift.
- 2—Vertical component of lift.
- 3—Positive yawing movement of the rudder.
- 4—Increased lift on the lowered wing and decreased lift on the raised wing.

3529. Changes in the center of pressure of a wing affect the aircraft's

- 1—aerodynamic balance and controllability.
- 2—center-of-gravity location.
- 3—lifting capacity.
- 4—lift/drag ratio.

3530. Adverse yaw during a turn entry is caused by

- 1—increased parasite drag on the raised wing and decreased parasite drag on the lowered wing.
- 2—the same rate of motion between the raised wing and lowered wing.
- 3—increased induced drag on the lowered wing and decreased induced drag on the raised wing.
- 4—decreased induced drag on the lowered wing and increased induced drag on the raised wing.

3531. When rolling out of a steep-banked turn, what causes the lowered aileron to create more drag than when rolling into the turn?

- 1—The differential in aileron travel is greater.
- 2—The wing's angle of attack is greater as the rollout is started.
- 3—The wing being raised is traveling faster through the air than the wing being lowered.
- 4—The wing being lowered is traveling faster through the air and producing more lift than the wing being raised.

3532. Which action is necessary to make the airplane turn?

- 1—Change the direction of thrust.
- 2—Change the direction of lift.
- 3—Yaw the aircraft.
- 4—Increase the angle of attack.

3533. What changes in aircraft control must be made to maintain altitude while the airspeed is being decreased?

- 1—Increase the angle of attack to compensate for the decreasing lift.
- 2—Increase the angle of attack to produce more lift than drag.
- 3—Decrease the angle of attack to compensate for the increasing drag.
- 4—Maintain a constant angle of attack until the desired airspeed is reached, then increase the angle of attack.

3534. The angle of attack of a wing directly controls the

- 1—amount of airflow above and below the wing.
- 2—point at which the center of gravity is located.
- 3—distribution of positive and negative pressure acting on the wing.
- 4—angle of incidence of the wing.

3535. The angle of attack at which an aircraft stalls

- 1—decreases with an increase in engine power.
- 2—remains constant regardless of gross weight.
- 3—increases with an increase in engine power.
- 4—varies with gross weight and density altitude.

3536. Which statement is true relating to the factors which produce stalls?

- 1—An accelerated stall will always produce a spin.
- 2—The stalling angle of attack is independent of the speed of airflow over the wings.
- 3—The stalling angle of attack depends upon the speed of the airflow over the wings.
- 4—The critical angle of attack is a function of the degree of bank.

3537. If the same angle of attack is maintained in ground effect as when out of ground effect, lift will

- 1—increase, and induced drag will decrease.
- 2—decrease, and parasite drag will increase.
- 3—increase, and induced drag will increase.
- 4—decrease, and parasite drag will decrease.

3538. Which of the following is a result of ground effect?

- 1—An increase in the wing's downwash with no increase in angle of attack.
- 2—An increase in wingtip vortices at a given angle of attack.
- 3—An increase in lift with no increase in angle of attack.
- 4—An increase in induced drag with no change in angle of attack.

3539. It is possible to fly an airplane just clear of the ground at a slightly slower airspeed than that required to sustain level flight at higher altitudes. This is the result of

- 1—a cushioning effect of the air as it is trapped between the ground and the descending airplane.
- 2—increased thrust at low altitudes due to increased air density.
- 3—ground interference with the static pressure system which produces false indications on the airspeed indicator.
- 4—interference of the ground surface with the airflow patterns about the airplane in flight.

3540. An airplane leaving ground effect will

- 1—experience a decrease in stability and a noseup change in moments.
- 2—produce an increase in static source pressure and an increase in airspeed.
- 3—experience a decrease in thrust required.
- 4—require a lower angle of attack to attain the same lift coefficient.

3541. An airplane is usually affected by ground effect at what height above the surface?

- 1—Between 100 and 200 feet above the surface in calm wind conditions.
- 2—Less than half the airplane's wingspan above the surface.
- 3—Twice the airplane's wingspan above the surface.
- 4—Three to four times the airplane's wingspan.

3542. If a load factor of 2.5 was imposed on an airplane that weighs 2,675 pounds, the airload imposed on that airplane would be

- 1—2,675 pounds.
- 2—4,012.5 pounds.
- 3—5,350 pounds.
- 4—6,687.5 pounds.

3543. An airplane has a normal stalling speed of 62 MPH but is forced into an accelerated stall at twice that speed. What maximum load factor will result from this maneuver?

- 1—1 G.
- 2—2 G's.
- 3—3 G's.
- 4—4 G's.

3544. If severe turbulence is encountered, the airplane's airspeed should be reduced to

- 1—maneuvering speed.
- 2—the minimum steady flight speed in the landing configuration.
- 3—normal structural cruising speed.
- 4—maximum structural cruising speed.

3545. (Refer to figure 14.) A positive load factor of 4 at 140 MPH would cause the airplane to

- 1—climb at a steady rate.
- 2—be subjected to structural damage.
- 3—break apart.
- 4—stall.

3546. (Refer to figure 14.) What load factor would be created if positive 30 FPS gusts were encountered at 130 MPH?

- 1—1.8.
- 2—2.0.
- 3—3.0.
- 4—3.8.

3547. (Refer to figure 14.) The horizontal dashed line from point B to point D represents the

- 1—maximum structural cruise airspeed range.
- 2—positive limit load factor.
- 3—airspeed range for normal operations.
- 4—ultimate load factor.

3548. The airspeed indicated by point B in figure 14 is

- 1— V_D .
- 2— V_{NE} .
- 3— V_{NO} .
- 4— V_A .

3549. The airspeed indicated by point D in figure 14 is

- 1— V_D .
- 2— V_{NE} .
- 3— V_{NO} .
- 4— V_A .

3550. The airspeed indicated by point C in figure 14 is

- 1— V_D .
- 2— V_{NE} .
- 3— V_{NO} .
- 4— V_A .

3551. (Refer to figure 15.) What increase in load factor would take place if the angle of bank were increased from 60° to 80°?

- 1—1 G.
- 2—2 G's.
- 3—3 G's.
- 4—4 G's.

3552. (Refer to figure 15.) What is the stall speed of an airplane under a load factor of 4 if the unaccelerated stall speed is 70 knots?

- 1—91 knots.
- 2—116 knots.
- 3—132 knots.
- 4—140 knots.

3553. (Refer to figure 15.) If, during a steady turn with a 50° bank, a load factor of 1.5 were imposed on an airplane which has an unaccelerated stall speed of 60 knots, at what speed would the airplane first stall?

- 1—60 knots.
- 2—68 knots.
- 3—75 knots.
- 4—82 knots.

3554. (Refer to figure 15.) A 70 percent increase in stalling speed would imply a bank angle of

- 1—67°.
- 2—70°.
- 3—83°.
- 4—85°.

3555. (Refer to figure 15.) What is the stall speed of an airplane under a load factor of 2 if the unaccelerated stall speed is 100 knots?

- 1—140 knots.
- 2—129 knots.
- 3—115 knots.
- 4—110 knots.

3556. (Refer to figure 16.) Which statement is true regarding airplane flight at L/D_{max} ?

- 1—Any angle of attack other than that for L/D_{max} increases the lift/drag ratio.
- 2—Any angle of attack other than that for L/D_{max} increases total drag for a given airplane's lift.
- 3—The angle of attack for L/D_{max} is greater than that for maximum coefficient of lift.
- 4—Any angle of attack other than that for L/D_{max} increases parasite drag.

3557. (Refer to figure 16.) The L/D at 2° angle of attack is approximately the same as the L/D for

- 1—9.75° angle of attack.
- 2—10.5° angle of attack.
- 3—16.5° angle of attack.
- 4—19.0° angle of attack.

3558. (Refer to figure 16.) At which angle of attack does the airplane travel the maximum horizontal distance per foot of altitude lost?

- 1—2.8°.
- 2—6°.
- 3—12.3°.
- 4—20°.

3559. The primary purpose of high-lift devices is to increase the

- 1— L/D_{max} .
- 2—lift at slow speeds.
- 3—drag and reduce airspeed.
- 4—approach and landing speeds.

3560. The use of a slot in the leading edge of the wing enables the airplane to land at a slower speed because it

- 1—changes the camber of the wing.
- 2—increases the ground effect.
- 3—decelerates the upper surface boundary layer air.
- 4—delays the stall to a higher angle of attack.

3561. Which statement is true concerning the aerodynamic conditions which occur during a spin entry?

- 1—After a full stall, both wings remain in a stalled condition throughout the rotation.
- 2—After a full stall, the wing that drops continues in a stalled condition while the rising wing regains and continues to produce some lift, causing the rotation.
- 3—After a partial stall, both wings continue to produce some lift which causes the rotation.
- 4—After a partial stall, the wing that drops remains in a stalled condition while the rising wing regains and continues to produce lift, causing the rotation.

3562. (Refer to figure 17.) At the airspeed represented by point a, in steady flight, the aircraft will

- 1—be structurally damaged by full deflection of the controls.
- 2—have its maximum lift/drag ratio.
- 3—have its minimum lift/drag ratio.
- 4—be developing its maximum coefficient of lift.

3563. (Refer to figure 17.) At an airspeed represented by point b, in steady flight, the pilot can expect to obtain the aircraft's

- 1—minimum glide range in still air.
- 2—maximum glide range in still air.
- 3—maximum coefficient of lift.
- 4—minimum coefficient of lift.

3564. Which of the following aircraft characteristics contribute to spiral instability?

- 1—Strong static directional stability and strong dihedral effect.
- 2—Strong static directional stability and weak dihedral effect.
- 3—Weak static directional stability and weak dihedral effect.
- 4—Weak static directional stability and strong dihedral effect.

3565. The most desirable type of stability for an aircraft to possess is

- 1—neutral static stability.
- 2—neutral dynamic stability.
- 3—positive static stability.
- 4—positive dynamic stability.

3566. The tendency of an aircraft to develop forces which restore it to its original condition, when disturbed from a condition of steady flight, is known as

- 1—controllability.
- 2—maneuverability.
- 3—stability.
- 4—balance.

3567. The tendency of an aircraft to develop forces that further remove the airplane from its original position, when disturbed from a condition of steady flight, is known as

- 1—dynamic instability.
- 2—neutral static stability.
- 3—static instability.
- 4—positive static stability.

3568. If the aircraft's nose initially tends to return to its original position after the elevator control is pressed forward and released, the airplane displays

- 1—negative static stability.
- 2—positive static stability.
- 3—negative dynamic stability.
- 4—neutral dynamic stability.

3569. If the aircraft's nose initially tends to move farther from its original position after the elevator control is pressed forward and released, the aircraft displays

- 1—negative static stability.
- 2—positive static stability.
- 3—positive dynamic stability.
- 4—neutral dynamic stability.

3570. The quality of an airplane that permits it to be operated easily and to withstand the stresses imposed on it is

- 1—stability.
- 2—controllability.
- 3—malleability.
- 4—maneuverability.

3571. The capability of an airplane to respond to the pilot's inputs, especially with regard to flightpath and attitude, is

- 1—balance.
- 2—response.
- 3—controllability.
- 4—maneuverability.

3572. If the aircraft's nose remains in the new position after the elevator control is pressed forward and released, the aircraft displays

- 1—negative static stability.
- 2—neutral dynamic stability.
- 3—positive static stability.
- 4—neutral static stability.

3573. If the airspeed increases and decreases during longitudinal phugoid oscillations, the aircraft

- 1—can be easily controlled by the pilot.
- 2—can not be controlled by the pilot.
- 3—will display poor trimming qualities.
- 4—is constantly changing angle of attack making it difficult for the pilot to reduce the magnitude of the oscillations.

3574. If an aircraft has negative dynamic and positive static stability this will result in

- 1—damped oscillations.
- 2—undamped oscillations.
- 3—convergent oscillations.
- 4—divergent oscillations.

3575. If an increase in power tends to make the nose of the aircraft rise this is the result of the

- 1—center of lift being ahead of the center of gravity.
- 2—line of thrust passing through the center of gravity.
- 3—center of lift and center of gravity being collocated.
- 4—line of thrust being below the center of gravity.

3576. Which subsonic planforms provides the best lift coefficient?

- 1—Rectangular wing.
- 2—Tapered wing.
- 3—Elliptical wing.
- 4—Pointed tip wing.

3577. On which wing planform does the stall begin at the wingtip and progress inward toward the wing root?

- 1—Rectangular wing.
- 2—Elliptical wing.
- 3—Moderate taper wing.
- 4—Sweepback wing.

3578. Which statement is generally true regarding wing camber of a glider's airfoil?

- 1—There is no camber on either the upper or lower surface of the wing.
- 2—The camber is the same on both the upper and lower surface of the wing.
- 3—The camber is less on the upper wing surface than it is on the lower surface of the wing.
- 4—The camber is greater on the upper wing surface than it is on the lower surface of the wing.

3579. A rectangular wing, as compared to other wing planforms, has a tendency to stall first at the

- 1—wing root providing adequate stall warning.
- 2—wingtip providing adequate stall warning.
- 3—wing root providing inadequate stall warning.
- 4—wingtip providing inadequate stall warning.

3580. In comparing a straight wing and a sweepback wing of the same wing area and wing loading, the sweepback wing has the advantage of

- 1—lower stalling speed.
- 2—greater mean aerodynamic chord.
- 3—increased longitudinal stability.
- 4—higher critical Mach number.

3581. Which adverse stability characteristic is caused by sweepback?

- 1—Increase of dutchroll tendency.
- 2—Increase of longitudinal static stability.
- 3—Increase of Mach tuck tendency.
- 4—Increase of critical Mach number.

3582. The purpose of aircraft wing dihedral angle is to

- 1—increase lateral stability.
- 2—increase longitudinal stability.
- 3—increase lift coefficient of the wing.
- 4—decrease drag coefficient of the wing.

3583. Aspect ratio of a wing is defined as the ratio of the

- 1—wingspan to the wing root.
- 2—square of the chord to the wingspan.
- 3—wingspan to the mean chord.
- 4—wing spar to the main compression rib.

3584. A wing with a very high aspect ratio (in comparison with a low aspect ratio wing) will have

- 1—increased drag at high angles of attack.
- 2—decreased wing performance when in a climbing attitude.
- 3—poor control qualities at low airspeeds.
- 4—a low stall speed.

3585. At a constant velocity in airflow, a high aspect ratio wing will have (in comparison with a low aspect ratio wing)

- 1—decreased drag, especially at a high angle of attack.
- 2—increased drag, especially at a high angle of attack.
- 3—increased drag, especially at a low angle of attack.
- 4—decreased wing performance when in a climbing attitude.

3586. (Refer to figure 18.) Which aircraft has the highest aspect ratio?

- 1—A.
- 2—B.
- 3—C.
- 4—D.

3587. (Refer to figure 18.) Which aircraft has the lowest aspect ratio?

- 1—A.
- 2—B.
- 3—C.
- 4—D.

3588. (Refer to figure 18.) Consider only aspect ratio (other factors remain constant). Which aircraft will generate greatest lift?

- 1—A.
- 2—B.
- 3—C.
- 4—D.

3589. (Refer to figure 18.) Consider only aspect ratio (other factors remain constant). Which aircraft will generate greatest drag?

- 1—A.
- 2—B.
- 3—C.
- 4—D.

3590. (Refer to figure 19.) While rolling into a right turn, if the inclinometer appears as illustrated in A, the HCL and CF vectors would be acting on the aircraft as illustrated in

- 1—4, and more right rudder pressure is needed to center the ball.
- 2—2, and more right rudder pressure is needed to center the ball.
- 3—4, and more left rudder pressure is needed to center the ball.
- 4—2, and more left rudder pressure is needed to center the ball.

3591. (Refer to figure 19.) While rolling into a right turn, if the inclinometer appears as illustrated in C, the HCL and CF vectors would be acting on the aircraft as illustrated in

- 1—3, and less right rudder pressure is needed to center the ball.
- 2—5, and more right rudder pressure is needed to center the ball.
- 3—5, and less right rudder pressure is needed to center the ball.
- 4—3, and more right rudder pressure is needed to center the ball.

3592. (Refer to figure 19.) While rolling out of a left turn, if the inclinometer appears as illustrated in A, the HCL and CF vectors would be acting on the aircraft as illustrated in

- 1—2, and more right rudder pressure is needed to center the ball.
- 2—2, and more left rudder pressure is needed to center the ball.
- 3—4, and more left rudder pressure is needed to center the ball.
- 4—4, and more right rudder pressure is needed to center the ball.

3593. As a result of gyroscopic precession it can be said that any

- 1—yawing around the vertical axis results in a pitching moment.
- 2—pitching around the lateral axis results in a rolling moment.
- 3—rolling around the longitudinal axis results in a pitching moment.
- 4—pitching around the longitudinal axis results in a yawing moment.

3594. Propeller slip is the difference between the

- 1—plane of rotation of the propeller, and forward velocity of the airplane.
- 2—slipstream velocity and forward velocity of the airplane.
- 3—geometric pitch and blade angle of the propeller.
- 4—geometric pitch and the effective pitch of the propeller.

3595. The distance a propeller actually advances in one revolution is

- 1—effective pitch.
- 2—slippage.
- 3—geometric pitch.
- 4—twisting.

3596. Blade angle of a propeller is defined as the angle between the

- 1—angle of attack and chord line.
- 2—chord line and relative wind.
- 3—angle of attack and line of thrust.
- 4—chord line and plane of rotation.

3597. A propeller rotating clockwise as seen from the rear, creates a spiraling slipstream that tends to rotate the aircraft to the

- 1—right around the vertical axis, and to the right around the longitudinal axis.
- 2—right around the vertical axis, and to the left around the longitudinal axis.
- 3—left around the vertical axis, and to the right around the longitudinal axis.
- 4—left around the vertical axis, and to the left around the longitudinal axis.

3598. The left turning tendency of an aircraft caused by P-factor is the result of the

- 1—clockwise rotation of the engine and the propeller turning the aircraft counterclockwise.
- 2—propeller blade descending on the right, producing more thrust than the ascending blade on the left.
- 3—gyroscopic forces applied to the rotating propeller blades acting 90° in advance of the point the force was applied.
- 4—spiral characteristics of the slipstream air being forced rearward by the rotating propeller.

3599. The reason for variations in geometric pitch (twisting) along a propeller blade is that it

- 1—permits a relatively constant angle of incidence along its length when in cruising flight.
- 2—prevents the portion of the blade near the hub to stall during cruising flight.
- 3—permits a relatively constant angle of attack along its length when in cruising flight.
- 4—prevents asymmetrical loading of the propeller during a climb.

3600. With regard to gyroscopic precession, when a force is applied at a point on the rim of a spinning disc the resultant force acts in which direction and at what point?

- 1—In the same direction as the applied force, at the point of the applied force.
- 2—In the opposite direction of the applied force, at the point of the applied force.
- 3—In the same direction as the applied force, 90° ahead in the plane of rotation.
- 4—In the opposite direction of the applied force, 90° ahead in the plane of rotation.

3601. The critical engine on most light multiengine airplanes with clockwise rotating propellers, is the

- 1—right engine, because of the P-factor of the right propeller.
- 2—left engine, because of the P-factor of the left propeller.
- 3—right engine, because of the P-factor of the left propeller.
- 4—left engine, because of the P-factor of the right propeller.

3602. In a multiengine airplane with engines which rotate clockwise, the critical engine is the

- 1—left engine, because the right engine center of thrust is farther away from the centerline of the fuselage.
- 2—left engine, because the right engine center of thrust is closer to the centerline of the fuselage.
- 3—right engine, because the left engine center of thrust is farther away from the centerline of the fuselage.
- 4—right engine, because the left engine center of thrust is closer to the centerline of the fuselage.

3603. On a multiengine airplane, where the propellers rotate in the same direction, why is the loss of power on one engine more critical than the loss of power on the other engine?

- 1—Resistance to torque from one engine imposes a greater load on one wing, thereby increasing the stalling speed of that wing.
- 2—The asymmetric propeller thrust or P-factor, results in the center of thrust from one engine being farther from the airplane centerline than the center of thrust from the other engine.
- 3—Because the corkscrew pattern of airflow from one propeller is less effective against the airflow from the critical engine.
- 4—The torque reaction from operation of the critical engine is more severe around the vertical axis as well as the longitudinal axis.

3604. Rotor blade rotation during powered flight in a gyroplane is produced by the

- 1—interaction between engine propeller thrust and rotor blade drag.
- 2—transfer of engine power through the clutch to the rotor shaft.
- 3—drag on the rotor blade airfoil.
- 4—horizontal component of rotor lift.

3605. The rotor RPM may momentarily increase during the flare portion of a flare-type autorotation. This increase in rotor RPM is due to

- 1—a decrease in rotor drag brought about by a lack of forward motion.
- 2—the additional lift derived from the increased angle of attack of the main rotor disc.
- 3—an increased down-wash velocity.
- 4—ground effect.

3606. The rotor blade pitch angle is the acute angle between the blade chord line and the

- 1—direction of the relative wind.
- 2—rotor plane of rotation.
- 3—angle of attack.
- 4—horizon.

3607. Rotor blade flapping action is

- 1—an aerodynamic reaction to high-speed flight only.
- 2—an undesirable reaction to changes in airspeed and blade angle of attack.
- 3—a desirable design feature which compensates for dissymmetry of lift.
- 4—most pronounced in power-off descents.

3608. In forward flight and with the blade-pitch angle constant, the increased lift on the advancing blade will cause it to

- 1—flap down, causing an increase in the angle of attack.
- 2—flap up, causing a decrease in the angle of attack.
- 3—flap up, causing an increase in the angle of attack.
- 4—flap down, causing a decrease in the angle of attack.

3609. In certain single-rotor helicopters, the mast is rigged away from the vertical position by approximately 1°. This slight vertical offset is primarily for the purpose of counteracting

- 1—precession.
- 2—yaw.
- 3—torque.
- 4—drift.

3610. Coning is caused by the combined forces of

- 1—lift and centrifugal force.
- 2—drag, weight, and gravity.
- 3—weight and centrifugal force.
- 4—gravity and thrust.

3611. As each blade flaps up and down, it produces a shift of the center of its mass. When the blade flaps up, the CG moves closer to its axis of rotation, giving that blade a tendency to

- 1—decelerate its rotational velocity; this tendency is known as drag effect.
- 2—accelerate its rotational velocity; this tendency is known as Coriolis effect.
- 3—stabilize its rotational velocity, thus compensating for dissymmetry of lift.
- 4—decelerate its rotational velocity; this tendency is known as translating tendency.

3612. The forward speed of a rotorcraft is restricted primarily by

- 1—air density.
- 2—high-frequency vibrations.
- 3—dissymmetry of lift.
- 4—transverse flow effect.

3613. What is dissymmetry of lift?

- 1—The difference in lift that exists between the rearward part and the forward part of the rotor disc during forward flight.
- 2—A term used to differentiate between air flowing downward through the rotor in powered flight and upward through the rotor in autorotative flight.
- 3—The additional lift obtained when entering horizontal flight.
- 4—The difference in lift that exists between the advancing blade half and the retreating blade half of the disc area.

3614. When a rotorcraft transitions from straight-and-level flight into a 30° bank while maintaining a constant altitude, the total lift force must

- 1—remain constant, and the load factor will increase.
- 2—remain constant, and the load factor will decrease.
- 3—increase, and the load factor will decrease.
- 4—increase, and the load factor will increase.

3615. During forward cruising flight at constant airspeed and altitude, the individual rotor blades, when compared to each other, are operating at

- 1—unequal airspeed, equal angles of attack, and unequal lift moment.
- 2—constant airspeed, unequal angles of attack, and unequal lift moment.
- 3—unequal airspeed, unequal angles of attack, and equal lift moment.
- 4—constant airspeed, equal angles of attack, and equal lift moment.

3616. In the Northern Hemisphere, a magnetic compass will normally indicate a turn toward the north if

- 1—a right turn is entered from an east heading.
- 2—a left turn is entered from a west heading.
- 3—an aircraft is decelerated while on an east or west heading.
- 4—an aircraft is accelerated while on an east or west heading.

3617. In the Northern Hemisphere, if an aircraft is accelerated or decelerated, the magnetic compass will normally indicate

- 1—a turn momentarily, with changes in airspeed on any heading.
- 2—correctly when on a north or south heading while either accelerating or decelerating.
- 3—a turn toward the south while accelerating on a west heading.
- 4—a turn toward the north while decelerating on an east heading.

3618. Deviation error of the magnetic compass is caused by

- 1—certain metals and electrical systems within the aircraft.
- 2—the difference in location of true north and magnetic north.
- 3—acceleration and deceleration.
- 4—northerly turning error.

3619. In the Northern Hemisphere, which of the following would be correct about starting the rollout from a turn using a magnetic compass?

- 1—Start the rollout before the compass indication reaches south by approximately 30° plus the pilot's normal lead.
- 2—Start the rollout before the compass indication reaches south by a number of degrees approximately equal to the latitude over which the turn is made plus the pilot's normal lead.
- 3—Start the rollout after the compass indication passes south by a number of degrees approximately equal to the magnetic variation of the area over which the turn is made plus the pilot's normal lead.
- 4—Start the rollout after the compass indication passes south by a number of degrees approximately equal to the latitude minus the normal rollout lead.

3620. What should be the indication on the magnetic compass as you roll into a standard rate turn to the right from a south heading in the Northern Hemisphere?

- 1—The compass will indicate a turn to the right, but at a faster rate than is actually occurring.
- 2—The compass will initially indicate a turn to the left.
- 3—The compass will remain on south for a short time, then gradually catch up to the magnetic heading of the airplane.
- 4—The compass will indicate the approximate correct magnetic heading if the roll into the turn is smooth.

3621. What causes the northerly turning error in a magnetic compass?

- 1—Oversensitivity when nearer one of the magnetic poles.
- 2—Coriolis force at the mid-latitudes.
- 3—Centrifugal force acting on the compass card.
- 4—The magnetic dip characteristic.

3622. Which instrument would be affected by excessively low pressure in the airplane's vacuum system?

- 1—Vertical velocity indicator.
- 2—Airspeed indicator.
- 3—Pressure altimeter.
- 4—Heading indicator.

3623. If both the ram-air input and drain hole of the pitot system are blocked, what airspeed indication can be expected?

- 1—No variation of indicated airspeed in level flight even if large power changes are made.
- 2—Decrease of indicated airspeed during a climb.
- 3—Constant indicated airspeed during a descent.
- 4—Zero indicated airspeed until blockage is removed.

3624. Pitot-static system errors are generally the greatest in which range of airspeed?

- 1—Maneuvering speed.
- 2—High airspeed.
- 3—Low airspeed.
- 4—Cruising airspeed.

3625. During power-off stalls with flaps full down, the stall occurs and the pointer on the airspeed indicator shows a speed less than the minimum limit of the white arc on the indicator. This is most probably due to

- 1—installation error in the pitot-static system.
- 2—a malfunction in the pitot-static system.
- 3—a high density altitude.
- 4—a low density altitude.

3626. If a pitot tube is clogged, which of these instruments would be affected?

- 1—Vertical speed indicator.
- 2—Altimeter.
- 3—Airspeed indicator.
- 4—Turn needle.

3627. If the static pressure tubes are broken inside a pressurized cabin during a high-altitude flight, the altimeter would probably indicate

- 1—higher than actual flight altitude.
- 2—sea level.
- 3—a fluctuating altitude.
- 4—lower than actual flight altitude.

3628. Which statement is true about the effect of temperature changes on the indications of a sensitive altimeter?

- 1—Colder-than-standard temperatures will place the aircraft lower than the altimeter indicates.
- 2—Warmer-than-standard temperatures will place the aircraft lower than the altimeter indicates.
- 3—Colder-than-standard temperatures will place the aircraft higher than the altimeter indicates.
- 4—Temperature changes have no effect on the altimeter indications.

3629. A possible result of using the emergency alternate source of static pressure inside the cabin of an unpressurized airplane is the

- 1—airspeed indicator may indicate less than normal.
- 2—altimeter may indicate an altitude higher than the actual altitude being flown.
- 3—vertical velocity indicator may indicate a continuous descent.
- 4—altimeter may indicate an altitude lower than the actual altitude being flown.

3630. Excessively high engine temperatures, either in the air or on the ground, will

- 1—result in damage to heat-conducting hoses and warping of the cylinder cooling fans.
- 2—cause loss of power, excessive oil consumption, and possible permanent internal engine damage.
- 3—not appreciably affect an aircraft in either environment.
- 4—increase fuel consumption and may increase power due to the increased heat.

3631. If the engine oil temperature and cylinder head temperature gauges have exceeded their normal operating range, you may have been

- 1—operating with the mixture set too rich.
- 2—operating with higher-than-normal oil pressure.
- 3—using fuel that has a higher-than-specified fuel rating.
- 4—operating with too much power and with the mixture set too lean.

3632. Prior to starting the engine the manifold pressure gauge usually indicates approximately 29" Hg. This is because the

- 1—pointer on the gauge is stuck at the full-power indication.
- 2—throttle is in the full-open position.
- 3—throttle is closed, trapping a high air pressure in the manifold.
- 4—pressure within the manifold is the same as atmospheric pressure.

3633. The amount of water absorbed in aviation fuels will

- 1—remain the same regardless of temperature changes.
- 2—decrease as the temperature of the fuel increases.
- 3—increase as the temperature of the fuel increases.
- 4—increase as the temperature of the fuel decreases.

3634. To properly purge water from the fuel system of an airplane equipped with fuel tank sumps and a fuel strainer quick drain, it is necessary to drain fuel from the

- 1—lowest point in the fuel system only.
- 2—fuel strainer drain and the fuel tank sumps.
- 3—fuel tank sump drains only.
- 4—fuel strainer drain only.

3635. If the grade of fuel used in an aircraft engine is lower than specified for the engine, it will most likely cause

- 1—a mixture of fuel and air that is not uniform in all cylinders.
- 2—lower cylinder head temperatures.
- 3—an increase in power which could overstress internal engine components.
- 4—detonation.

3636. With regard to the use of aviation gasoline, which statement is true?

- 1—Use of a higher-than-specified grade of fuel usually results in lower-than-normal cylinder head temperatures.
- 2—Use of the next higher-than-specified grade of fuel is permissible if the specified grade of fuel is not available.
- 3—Use of the next lower-than-specified grade of fuel results in the fuel withstanding higher pressures without detonating.
- 4—Use of a lower-than-specified grade of fuel may result in a reduced power output but is usually less harmful than higher rated fuel.

3637. Which of these is the main reason that fuel tank vents must be open?

- 1—To allow proper air pressure within the tanks for maintaining a steady fuel flow.
- 2—To allow fuel fumes to escape from the tanks, thus eliminating the possibility of the tanks exploding.
- 3—To allow excess fuel to drain overboard when heat expands the volume of fuel within the tanks.
- 4—To allow air to enter and prevent moisture from condensing and contaminating the fuel within the tanks.

3638. Which statement is true regarding fouling of the spark plugs of an aircraft engine?

- 1—Excessive heat in the combustion chamber of a cylinder causes oil to form on the center electrode of a spark plug and this fouls the plug.
- 2—Spark plug fouling results from operating with an excessively rich mixture.
- 3—Permitting the engine to idle for a long period of time on the ground is the best way to clear fouled spark plugs.
- 4—Carbon fouling of the spark plugs is caused primarily by operating an engine at excessively high cylinder head temperatures.

3639. Which of these will occur if no leaning is made with the mixture control as the flight altitude increases?

- 1—The volume of air entering the carburetor remains constant and the amount of fuel decreases.
- 2—The volume of air entering the carburetor decreases and the amount of fuel decreases.
- 3—The density of air entering the carburetor decreases and the amount of fuel remains constant.
- 4—The density of air entering the carburetor decreases and the amount of fuel increases.

3640. When the pilot leans the mixture control, which of the following is being accomplished?

- 1—The volume of air entering the carburetor is being reduced.
- 2—The amount of fuel entering the combustion chamber is being increased.
- 3—The volume of air entering the carburetor is being increased.
- 4—The amount of fuel entering the combustion chamber is being reduced.

3641. The main purpose of the mixture control is to

- 1—adjust the fuel flow to obtain the proper air/fuel ratio.
- 2—increase the engine RPM or manifold pressure.
- 3—increase the air supplied to the engine.
- 4—decrease the fuel supplied to the engine as the airplane descends.

3642. Proper mixture control and better economy in the operation of a fuel injected engine can be achieved best by use of

- 1—a fuel-flow gauge.
- 2—an exhaust gas temperature indicator.
- 3—the oil pressure indicator.
- 4—the recommended manifold and RPM setting for a particular altitude.

3643. Fuel/air ratio is the ratio between the

- 1—volume of fuel and volume of air entering the cylinder.
- 2—volume of fuel and volume of air entering the carburetor.
- 3—weight of fuel and weight of air entering the cylinder.
- 4—weight of fuel and weight of air entering the carburetor.

3644. Which statement is true regarding fouling of the spark plugs of an aircraft engine?

- 1—Excessive heat in the combustion chamber of a cylinder causes oil to form on the center electrode of a spark plug and this fouls the plug.
- 2—Spark plug fouling results from operating with an excessively rich mixture.
- 3—Permitting the engine to idle for a long period of time on the ground is the best way to clear fouled spark plugs.
- 4—Carbon fouling of the spark plugs is caused primarily by operating an engine at excessively high cylinder head temperatures.

3645. If the fuel/air mixture is too rich, this results in

- 1—smooth engine operation.
- 2—increase in power.
- 3—spark plug fouling.
- 4—normal fuel consumption.

3646. Detonation in an aircraft engine is most likely to occur whenever

- 1—the engine is operated under conditions which cause the fuel mixture to burn instantaneously.
- 2—the fuel/air ratio is such that the mixture burns extremely slow.
- 3—one spark plug misfires under high compression.
- 4—the fuel being used is of a higher grade than recommended by the engine manufacturer.

3647. What energy source is used to drive the turbines of a turbocharged airplane?

- 1—Electrical system.
- 2—Ignition system.
- 3—Engine exhaust gases.
- 4—Engine compressor.

3648. Float-type carburetor systems, compared to fuel injection systems, are generally considered to be

- 1—more susceptible to impact icing than a fuel injection unit.
- 2—less susceptible to icing than a fuel injection unit only when visible moisture is present.
- 3—more susceptible to icing than a fuel injection unit.
- 4—less susceptible to icing than a fuel injection unit.

3649. The operating principle of float-type carburetors is based on the

- 1—automatic metering of air at the venturi as the aircraft gains altitude.
- 2—difference in air pressure at the venturi throat and the throttle valve.
- 3—increase in air velocity in the throat of a venturi causing a decrease in air pressure.
- 4—measurement of the fuel flow into the induction system.

3650. One advantage of fuel injection systems over carburetor systems is

- 1—less difficulty with hot weather vapor locks during ground operations.
- 2—better fuel distribution to the cylinders.
- 3—easier hot-engine starting.
- 4—easier in-flight restarting.

3651. The presence of carburetor ice, in an airplane equipped with a fixed-pitch propeller can be verified by applying carburetor heat and noting

- 1—an increase in RPM and then a gradual decrease in RPM.
- 2—a decrease in RPM and then a constant RPM indication.
- 3—an immediate increase in RPM with no further change in RPM.
- 4—a decrease in RPM and then a gradual increase in RPM.

3652. The first indication of carburetor icing in airplanes equipped with constant-speed propellers would most likely be a

- 1—rough running engine followed by an increase in manifold pressure.
- 2—decrease in manifold pressure.
- 3—decrease in RPM.
- 4—rough running engine followed by loss of RPM.

3653. The first indication of carburetor ice in an aircraft with a fixed-pitch propeller is

- 1—an increase in RPM.
- 2—a decrease in RPM.
- 3—an increase in manifold pressure.
- 4—a decrease in manifold pressure.

3654. The low temperature that causes carburetor ice in an engine equipped with a float-type carburetor is normally the result of the

- 1—compression of air at the carburetor venturi.
- 2—low volatility of the fuel.
- 3—vaporization of fuel and expansion of air in the carburetor.
- 4—freezing temperature of the air entering the carburetor.

3655. Concerning carburetor icing, which statement is true?

- 1—Carburetor icing would most likely form when the air temperature is between 20° F and 70° F with visible moisture or high humidity.
- 2—The carburetor heater is a deicing device that heats the air after it enters the carburetor.
- 3—The first indication of carburetor icing in an airplane equipped with a fixed-pitch propeller is an increase in RPM, followed by a decrease in RPM.
- 4—Carburetor icing will form in a carburetor whenever the ambient temperature is below freezing .32° F (0° C).

3656. When is vapor lock most likely to occur in an airplane with a fuel injection system?

- 1—During cold, damp days.
- 2—During ground operations on hot days.
- 3—When the engine is operated at high-power settings.
- 4—After turning off the fuel boost pump.

3657. Which statement is true regarding propeller efficiency?

- 1—Propeller efficiency is not affected by propeller slippage.
- 2—Propeller efficiency is the ratio of thrust horsepower to brake horsepower.
- 3—Propeller efficiency is the theoretical distance a propeller should advance in one revolution.
- 4—Propeller efficiency is the actual distance a propeller advances in one revolution.

3658. When operating an aircraft with a constant-speed propeller, which procedure places the least stress on cylinder components?

- 1—Whether power settings are being increased or decreased, RPM is adjusted before manifold pressure.
- 2—When power settings are being increased, increase manifold pressure before RPM.
- 3—When power settings are being decreased, reduce manifold pressure before RPM.
- 4—When power settings are being decreased, reduce RPM before manifold pressure.

3659. What is the primary advantage of a constant-speed propeller?

- 1—To obtain and maintain a selected pitch angle of the blades regardless of the flight situation or power setting.
- 2—To obtain a pitch setting that is suitable for each flight situation and power setting.
- 3—To maintain a specific engine speed.
- 4—To control the power output developed by the engine.

3660. During climbing flight using a turbocharged airplane, the manifold pressure will remain approximately constant until

- 1—an outside air temperature of 18° C is reached.
- 2—The waste gate is fully open and the turbine is operating at minimum speed.
- 3—the engine's critical altitude is reached.
- 4—the airplane's service ceiling is reached.

3661. During which stroke of a reciprocating engine is the gaseous mixture expanding within the cylinder?

- 1—Intake stroke.
- 2—Compression stroke.
- 3—Power stroke.
- 4—Exhaust stroke.

3662. To absorb maximum engine power and to develop maximum thrust, a constant-speed propeller should be adjusted to a blade angle which will produce a

- 1—small angle of attack and low RPM.
- 2—small angle of attack and high RPM.
- 3—large angle of attack and high RPM.
- 4—large angle of attack and low RPM.

3663. Concerning the advantages of an aircraft generator or alternator, select the true statement.

- 1—An alternator provides more electrical power at lower engine RPM than a generator.
- 2—A generator charges the battery during low engine RPM; therefore, the battery has less chance to become fully discharged, as often occurs with an alternator.
- 3—An alternator provides electrical current and eliminates the need for an aircraft to be equipped with a battery.
- 4—A generator always provides more electrical current than an alternator.

3664. In addition to an added safety factor, dual ignition systems also provide

- 1—better combustion.
- 2—increased spark plug life.
- 3—shorter engine warmup periods.
- 4—less engine vibrations.

3665. If the ground wire between the magneto and the ignition switch becomes disconnected, the most noticeable result will be that the engine

- 1—will run very rough.
- 2—cannot be started with the switch in the ON position.
- 3—cannot be shut down by turning the switch to the OFF position.
- 4—will detonate.

3666. An electrical system failure (battery and alternator) occurs during flight. In this situation, you would

- 1—probably experience failure of the engine ignition system, fuel gauges, aircraft lighting system, and avionics equipment.
- 2—probably experience engine failure due to the loss of the engine-driven fuel pump and also experience failure of the radio equipment, lights, and all instruments that require ac current.
- 3—experience avionics equipment failure.
- 4—experience high cylinder head temperature and low oil pressure indications.

3667. The purpose of an inverter is to

- 1—change direct current to alternating current.
- 2—stabilize the generator output.
- 3—monitor the performance of the electrical system.
- 4—stabilize the alternator output.

3668. The advantage of total energy compensators is that this system

- 1—adds the effect of stick thermals to the total energy produced by thermals.
- 2—compensates for air pressure changes while climbing or descending.
- 3—reduces climb and dive errors on variometer indications caused by airspeed changes.
- 4—includes a speed ring around the rim of the variometer.

3669. Which statement is true concerning total energy compensators?

- 1—The instrument will register climbs that result from stick thermals.
- 2—The instrument responds only to up and down air currents.
- 3—The instrument reacts to climbs and descends like a conventional rate-of-climb indicator.
- 4—The instrument indicates the average rate of climb in a thermal.

3670. Which statement is true concerning rotor systems?

- 1—The horizontal flapping hinge on a fully articulated rotor system enables the main rotor blades to hunt.
- 2—Dampers are normally incorporated in a fully articulated rotor system to prevent excessive motion about the spanwise axis of each rotor blade.
- 3—The main rotor blades of a semirigid rotor system can flap and feather as a unit.
- 4—The main rotor blades of a rigid rotor system can flap and drag but cannot feather.

3671. During the transition from pre-rotation to flight, all rotor blades change pitch

- 1—simultaneously to the same angle of incidence.
- 2—simultaneously but to different angles of incidence.
- 3—to the same degree at the same point in the cycle of rotation.
- 4—only as effective translational lift is attained.

3672. The main rotor blades of a fully-articulated rotor system can

- 1—flap and feather collectively.
- 2—flap, drag, and feather independently.
- 3—feather independently, but cannot flap or drag.
- 4—flap and drag independently, but can feather collectively only.

3673. What is the primary purpose of the freewheeling unit?

- 1—It provides speed reduction between the engine, main rotor system, and tail rotor system.
- 2—It provides disengagement of the engine from the rotor system for autorotation purposes.
- 3—It allows the engine to be started without driving the main rotor system.
- 4—It transmits engine power to the main rotor, tail rotor, generator/alternator, and other accessories.

3674. A high-frequency vibration that suddenly occurs during flight could be an indication of a defective

- 1—freewheeling unit.
- 2—ignition system.
- 3—transmission.
- 4—main rotor system.

3675. A high-frequency vibration in flight would most likely indicate potential trouble in the

- 1—main rotor system.
- 2—tail rotor due to improper rigging.
- 3—engine in most helicopters.
- 4—cyclic control linkage system.

3676. What is the primary purpose of the clutch?

- 1—It provides disengagement of the engine from the rotor system for autorotation.
- 2—It transmits engine power to the main rotor, tail rotor, generator/alternator, and other accessories.
- 3—It provides speed reduction between the engine and the main rotor system.
- 4—It allows the engine to be started without driving the main rotor system.

3677. Helicopter low-frequency vibrations are always associated with the

- 1—engine.
- 2—transmission.
- 3—tail rotor.
- 4—main rotor.

3678. (Refer to figure 20.) Which is a fowler flap?

- 1—A.
- 2—B.
- 3—C.
- 4—D.

3679. (Refer to figure 20.) Which is a plain flap?

- 1—A.
- 2—B.
- 3—C.
- 4—D.

3680. (Refer to figure 20.) Which is a slotted flap?

- 1—A.
- 2—B.
- 3—C.
- 4—D.

3681. (Refer to figure 20.) Which is a split flap?

- 1—A.
- 2—B.
- 3—C.
- 4—D.

3682. Which type of flap creates the greatest change in pitching moment?

- 1—Plain.
- 2—Slotted.
- 3—Split.
- 4—Fowler.

3683. Which type of flap creates the least change in pitching moment?

- 1—Plain.
- 2—Slotted.
- 3—Split.
- 4—Fowler.

3684. Which type of flap is characterized by large increases in lift coefficient with minimum changes in drag?

- 1—Plain.
- 2—Slotted.
- 3—Split.
- 4—Fowler.

3685. GIVEN:

Airport elevation..... 5,515 ft
OAT..... 65° F
Altimeter setting..... 29.40" Hg

Determine the density altitude (see figure 21).

- 1—9,250 feet.
- 2—9,050 feet.
- 3—8,400 feet.
- 4—6,000 feet.

3686. GIVEN:

Airport elevation..... 3,795 ft
OAT..... 75° F
Altimeter setting..... 29.70" Hg

Determine the density altitude (see figure 21).

- 1—6,200 feet.
- 2—5,900 feet.
- 3—3,900 feet.
- 4—3,000 feet.

3687. GIVEN:

Airport elevation..... 3,450 ft
OAT..... 95° F
Altimeter setting..... 30.40" Hg

Determine the density altitude (see figure 21).

- 1—7,200 feet.
- 2—7,650 feet.
- 3—6,650 feet.
- 4—5,950 feet.

3688. Density altitude increases with

- 1—increases in temperature and moisture content of the air, and a decrease in pressure.
- 2—increases in pressure, temperature, and moisture content of the air.
- 3—an increase in temperature only.
- 4—increases in pressure and temperature, and a decrease in moisture content of the air.

3689. Of the following factors, which would increase the density altitude of a given airport?

- 1—An increase in atmospheric pressure.
- 2—An increase in air temperature.
- 3—A decrease in relative humidity.
- 4—An increase in altimeter setting.

3690. How does high density altitude affect rotorcraft performance?

- 1—It increases rotor drag, which requires more power for normal flight.
- 2—It increases rotor efficiency, but decreases engine efficiency.
- 3—Engine and rotor efficiency is reduced.
- 4—Engine and rotor efficiency is increased.

3691. Which statement is true regarding takeoff performance with high density altitude conditions?

- 1—The acceleration rate is slower because the engine and propeller efficiency is reduced.
- 2—The acceleration rate will increase since the lighter air creates less drag.
- 3—A shorter distance is required to accelerate to lift-off speed due to the reduced drag of lighter air.
- 4—A higher than normal indicated airspeed is required to produce sufficient lift since the air is less dense.

3692. If the atmospheric pressure and temperature remain the same, how would an increase in humidity affect takeoff performance?

- 1—Shorter takeoff distance; the air is less dense.
- 2—Longer takeoff distance; the air is more dense.
- 3—Longer takeoff distance; the air is less dense.
- 4—Shorter takeoff distance; the air is more dense.

3693. As altitude increases, the indicated airspeed at which a given airplane stalls in a particular configuration will

- 1—decrease as the true airspeed decreases.
- 2—decrease as the true airspeed increases.
- 3—remain the same as at low altitude.
- 4—increase because the air density becomes less.

3694. An aircraft is flying at a constant power setting and constant indicated altitude. As a result of a decrease in the outside air temperature, the true airspeed will

- 1—decrease, and the true altitude will increase.
- 2—decrease, and the true altitude will decrease.
- 3—increase, and the true altitude will increase.
- 4—increase, and the true altitude will decrease.

3695. An aircraft is flying at a constant indicated altitude and a constant power setting. As a result of an increase in the outside air temperature, the true airspeed will

- 1—increase, and the true altitude will decrease.
- 2—increase, and the true altitude will increase.
- 3—decrease, and the true altitude will decrease.
- 4—decrease, and the true altitude will increase.

3696. As density altitude increases, which will occur if a constant indicated airspeed is maintained in a no-wind condition?

- 1—True airspeed increases; groundspeed increases.
- 2—True airspeed increases; groundspeed decreases.
- 3—True airspeed decreases; groundspeed decreases.
- 4—True airspeed decreases; groundspeed increases.

3697. The most unfavorable combination of conditions for rotorcraft performance is

- 1—low density altitude, low gross weight, and calm wind.
- 2—low density altitude, high gross weight, and strong wind.
- 3—high density altitude, high gross weight, and calm wind.
- 4—high density altitude, high gross weight, and strong wind.

3698. The most favorable combination of conditions for rotorcraft performance is

- 1—low density altitude, high gross weight, and calm to light wind.
- 2—low density altitude, low gross weight, and moderate to strong wind.
- 3—high density altitude, low gross weight, and moderate to strong wind.
- 4—high density altitude, low gross weight, and calm to light wind.

3699. If all other factors remain the same, an increase in relative humidity will

- 1—increase the hovering ceiling because the air is more dense.
- 2—decrease the hovering ceiling because the air is more dense.
- 3—decrease the hovering ceiling because the air is less dense.
- 4—have no effect on the hovering ceiling.

3700. What effect does an uphill runway slope have upon takeoff performance?

- 1—Increases takeoff distance.
- 2—Increases takeoff speed.
- 3—Decreases takeoff distance.
- 4—Decreases takeoff speed.

3701. The best L/D ratio of a glider occurs when parasite drag is

- 1—equal to total drag.
- 2—equal to induced drag.
- 3—greater than induced drag.
- 4—less than induced drag.

3702. The best L/D ratio of a glider is a value that

- 1—varies depending upon the weight being carried.
- 2—varies depending upon the angle of attack required for different weights being carried.
- 3—remains constant regardless of airspeed changes.
- 4—remains constant and is independent of the weight being carried.

3703. Which is true about the effect on a glider's performance by the addition of ballast or weight?

- 1—The glide ratio at a given airspeed will increase.
- 2—A higher airspeed is required to obtain the same glide ratio as when lightly loaded.
- 3—The heavier the glider is loaded, the less the glide ratio will be at all airspeeds.
- 4—A heavily loaded glider takes a longer time than one lightly loaded to fly from one thermal to the next.

3704. Whenever climbing or descending through an inversion or wind shear zone, the pilot should be alert for which of the following changes in aircraft performance?

- 1—A sudden change in airspeed.
- 2—A fast rate of climb and a slow rate of descent.
- 3—A sudden surge of thrust.
- 4—A sudden decrease in power.

3705. Which statement is true relating to the effect of low level wind shear on aircraft performance?

- 1—A tailwind which shifts to a headwind causes an initial increase in airspeed.
- 2—A tailwind which shifts to a headwind causes the aircraft to pitch down.
- 3—A headwind which shifts to a tailwind causes an initial increase in airspeed.
- 4—A headwind which shifts to a tailwind causes the aircraft to pitchup.

3706. Which statement is true relating to the effect of low level wind shear on aircraft performance?

- 1—A tailwind which shifts to a headwind causes an initial decrease in airspeed.
- 2—A tailwind which shifts to a headwind causes the aircraft to pitch down.
- 3—A headwind which shifts to a tailwind causes an initial increase in airspeed.
- 4—A headwind which shifts to a tailwind causes the aircraft to pitch down.

3707. During departure when low level wind shifts to a tailwind or rapidly decreasing headwind, aircraft performance will

- 1—initially increase, then decrease.
- 2—remain unchanged.
- 3—decrease.
- 4—increase.

3708. What airspeed indicator marking identifies the maximum structural cruising speed of the airplane?

- 1—The upper limit of the white arc.
- 2—The upper limit of the green arc.
- 3—The upper limit of the yellow arc.
- 4—The red radial line.

3709. What does the lower limit of the white arc on an airspeed indicator represent?

- 1—Power-off stall speed, in a landing configuration.
- 2—Power-off stall speed, in a specified configuration.
- 3—Minimum controllable airspeed with flaps extended.
- 4—Minimum controllable airspeed during a power approach in landing configuration.

3710. What does the lower limit of the green arc on an airspeed indicator represent?

- 1—Power-off stall speed; in a landing configuration.
- 2—Power-off stall speed; in a specified configuration.
- 3—Minimum controllable airspeed; gear and flaps extended.
- 4—Minimum controllable airspeed; gear and flaps retracted.

3711. Which airspeed is identified by color coding on an airspeed indicator?

- 1—The maximum structural cruising speed.
- 2—The design maneuvering speed.
- 3—The stalling speed of all altitudes and configurations.
- 4—The maximum gear operation or extended speed.

3712. What is an important airspeed limitation that is not color coded on airspeed indicators?

- 1—Never-exceed speed.
- 2—Maximum structural cruising speed.
- 3—Maneuvering speed.
- 4—Maximum flaps-extended speed.

3713. In a twin-engine airplane, the single-engine service ceiling is the maximum density altitude at which V_{YSE} will produce

- 1—500 fpm rate of climb.
- 2—100 fpm rate of climb.
- 3—50 fpm rate of climb.
- 4—0 fpm rate of climb.

3714. When one engine fails on a twin-engine airplane, the resulting performance loss

- 1—is approximately 50 percent since 50 percent of the normally available thrust is lost.
- 2—causes the airplane to become uncontrollable, unless power output of the operating engine is reduced.
- 3—may reduce the rate of climb by 80 percent or more.
- 4—reduces cruise indicated airspeed by 50 percent or more.

3715. What is the significance of the blue radial line on the airspeed indicator of a light multiengine airplane and when is it to be used?

- 1—It indicates the speed which will provide the maximum altitude gain in a given time when one engine is inoperative and should be used for climb and final approach during engine-out operations.
- 2—It indicates the speed which will provide the greatest height for a given distance of forward travel when one engine is inoperative and should be used for all climbs during engine-out operations.
- 3—It indicates the minimum speed at which the airplane is controllable when the critical engine is suddenly made inoperative and should be used at all altitudes when an engine is inoperative.
- 4—It indicates the minimum safe single-engine speed and should be used during both normal and engine-out operations.

3716. When operating a light multiengine airplane at V_{MC} , the pilot should expect performance to be sufficient to maintain

- 1—heading.
- 2—heading and altitude.
- 3—heading, altitude, and be able to climb at 50 ft/min.
- 4—altitude.

3717. For an airplane with unsupercharged reciprocating engines, V_{MC}

- 1—increases with altitude.
- 2—decreases with altitude.
- 3—is not affected by altitude.
- 4—increases or decreases directly with temperature changes.

3718. Which of the following statements is true regarding the operation of a multiengine airplane with one engine inoperative?

- 1—Banking toward the operating engine increases V_{MC} .
- 2—Banking toward the inoperative engine increases V_{MC} .
- 3— V_{MC} is a designed performance factor which must be proven during type certification and will not change as long as the ball is centered with appropriate rudder pressure.
- 4—Loss of directional control is not likely to occur as long as adequate rudder pressure is applied to keep the ball centered.

3719. Which condition causes V_{MC} to be the highest?

- 1—CG is at the most forward allowable position.
- 2—CG is at the most rearward allowable position.
- 3—Gross weight is at the maximum allowable value.
- 4—Outboard fuel tanks are full and inboard fuel tanks are empty.

3720. (Refer to figure 22.) The gear is down and the flaps are set at 15°. If the angle of bank is 0°, what would be the indicated stall speed?

- 1—71 MPH.
- 2—80 MPH.
- 3—84 MPH.
- 4—88 MPH.

3721. (Refer to figure 22.) If the bank angle is 60°, the gear is down, and the flaps are set at 45°, what would be the indicated stall speed?

- 1—84 MPH.
- 2—93 MPH.
- 3—106 MPH.
- 4—110 MPH.

3722. (Refer to figure 22.) What would be the approximate indicated stall speed during a 40° bank with the gear down and flaps set at 15°?

- 1—92 MPH.
- 2—90 MPH.
- 3—88 MPH.
- 4—80 MPH.

3723. (Refer to figure 22.) With the gear down and flaps set at 45°, what would be the indicated stall speed if the angle of bank is 40°?

- 1—80 MPH.
- 2—83 MPH.
- 3—87 MPH.
- 4—90 MPH.

3724. (Refer to figure 23.) Determine the ground run required for takeoff.

Temperature..... 71° F
Pressure Altitude..... 3,500 ft
Weight..... 2,600 lb
Headwind..... 25 MPH

- 1—129 feet.
- 2—183 feet.
- 3—223 feet.
- 4—311 feet.

3725. (Refer to figure 23.) Determine the ground run required for takeoff.

Temperature..... 77° F
Pressure Altitude..... 2,000 ft
Weight..... 2,200 lb
Headwind..... 20 MPH

- 1—106 feet.
- 2—216 feet.
- 3—310 feet.
- 4—389 feet.

3726. (Refer to figure 23.) Determine the takeoff distance required to clear a 50-foot obstacle.

Temperature..... 72° F
Pressure Altitude..... 3,200 ft
Weight..... 2,300 lb
Headwind..... 15 MPH

- 1—553 feet.
- 2—606 feet.
- 3—668 feet.
- 4—754 feet.

3727. (Refer to figure 23.) Determine the takeoff distance required to clear a 50-foot obstacle.

Temperature..... 62° F
Pressure Altitude..... 6,000 ft
Weight..... 2,700 lb
Headwind..... 15 MPH

- 1—893 feet.
- 2—995 feet.
- 3—1,041 feet.
- 4—1,145 feet.

3728. (Refer to figure 24.) The indicated airspeed that would give the greatest gain in altitude in a unit of time at 3,200 feet is determined to be

- 1—93 MPH.
- 2—94 MPH.
- 3—113 MPH.
- 4—115 MPH.

3729. (Refer to figure 24.) What indicated airspeed at 3,000 feet would result in the greatest increase in altitude for a given distance?

- 1—94 MPH.
- 2—113 MPH.
- 3—115 MPH.
- 4—119 MPH.

3730. (Refer to figure 24.) To maintain the best rate of climb, the indicated speed should be

- 1—reduced approximately .8 MPH per 1,000 feet of altitude.
- 2—increased at least 1 MPH per 1,000 feet of altitude.
- 3—maintained at a constant value during the climb.
- 4—adjusted to maintain the specified rate of climb.

3731. In a propeller driven airplane maximum range occurs at

- 1—minimum power required.
- 2—maximum lift-drag ratio.
- 3—minimum drag required.
- 4—low cruise speed.

3732. (Refer to figure 25.) How much flight time would be available and still have a 30-minute fuel reserve?

Fuel qty..... 55 gal
Power-cruise (lean)..... 65 percent

- 1—2 hours 19 minutes.
- 2—2 hours 49 minutes.
- 3—3 hours 38 minutes.
- 4—4 hours 5 minutes.

3733. (Refer to figure 25.) Determine the amount of fuel consumed during takeoff and climb at 75 percent power for 15 minutes.

- 1—3.85 gallons.
- 2—4.6 gallons.
- 3—38.5 gallons.
- 4—46 gallons.

3734. (Refer to figure 25.) Determine the brake horsepower and fuel flow during takeoff from an airport with an elevation of 1,500 feet.

- 1—128 bhp and 9.8 GPH.
- 2—272 bhp and 23.1 GPH.
- 3—284 bhp and 22.8 GPH.
- 4—285 bhp and 24.3 GPH.

3735. (Refer to figure 25.) Determine the brake horsepower and fuel flow during takeoff from an airport with an elevation of 2,250 feet.

- 1—172 bhp and 15.2 GPH.
- 2—265 bhp and 22.4 GPH.
- 3—285 bhp and 21.0 GPH.
- 4—285 bhp and 24.3 GPH.

3736. GIVEN:

Height above terrain..... 12,000 ft
Headwind..... 20 kts

(Refer to figure 26.) What is the approximate glide distance?

- 1—26 miles.
- 2—24 miles.
- 3—23 miles.
- 4—21 miles.

3737. GIVEN:

Height above terrain..... 5,500 ft
Tailwind..... 10 kts

(Refer to figure 26.) What is the approximate glide distance?

- 1—13 miles.
- 2—12 miles.
- 3—11 miles.
- 4—10 miles.

3738. GIVEN:

Height above terrain..... 7,500 ft
Headwind..... 30 kts

(Refer to figure 26.) What is the approximate glide distance?

- 1—16 miles.
- 2—13 miles.
- 3—11 miles.
- 4—9 miles.

3739. GIVEN:

Height above terrain..... 10,500 ft
Tailwind..... 20 kts

(Refer to figure 26.) What is the approximate glide distance?

- 1—28 miles.
- 2—26 miles.
- 3—24 miles.
- 4—22 miles.

3740. The following conditions exist at an airport of intended landing:

Landing Rwy..... 30
Wind..... 020° at 15 kts

(Refer to figure 27.) A pilot can determine that the crosswind component is approximately

- 1—22 knots.
- 2—20 knots.
- 3—15 knots.
- 4—4 knots.

3741. The following conditions exist at an airport of intended landing:

Landing Rwy..... 3
Wind..... 060° at 35 kts

(Refer to figure 27.) A pilot can determine that the crosswind component is approximately

- 1—31 knots.
- 2—22 knots.
- 3—18 knots.
- 4—12 knots.

3742. The following conditions exist at an airport of intended landing:

Landing Rwy..... 13
Wind..... 140° at 30 kts

(Refer to figure 27.) A pilot can determine that the crosswind component is approximately

- 1—18 knots.
- 2—15 knots.
- 3—10 knots.
- 4—5 knots.

3743. The following conditions exist at an airport of intended landing:

Landing Rwy..... 22
Wind.....260° at 23 kts

(Refer to figure 27.) A pilot can determine that the crosswind component is approximately

- 1—10 knots.
- 2—15 knots.
- 3—17 knots.
- 4—25 knots.

3744. The maximum demonstrated crosswind component is equal to $0.2 V_{SO}$ and the following conditions exist at an airport of intended landing:

V_{SO} 70 kts
Landing Rwy..... 35
Wind.....300° at 20 kts

(Refer to figure 27.) A pilot can determine that the

- 1—headwind component exceeds the crosswind component.
- 2—headwind component is excessive.
- 3—crosswind component is within safe limits.
- 4—maximum demonstrated crosswind component is exceeded.

3745. The maximum demonstrated crosswind component is equal to $0.2 V_{SO}$ and the following conditions exist at an airport of intended landing:

V_{SO} 60 kts
Landing Rwy..... 12
Wind.....150° at 20 kts

(Refer to figure 27.) A pilot can determine that the

- 1—crosswind component exceeds the headwind component.
- 2—headwind component is excessive.
- 3—crosswind component is within safe limits.
- 4—maximum demonstrated crosswind component is exceeded.

3746. The maximum demonstrated crosswind component is equal to $0.2 V_{SO}$ and the following conditions exist at an airport of intended landing:

V_{SO} 65 kts
Landing Rwy..... 17
Wind.....200° at 30 kts

(Refer to figure 27.) A pilot can determine that the

- 1—crosswind component exceeds the headwind component.
- 2—maximum demonstrated crosswind component is exceeded.
- 3—crosswind component is within safe limits.
- 4—headwind component is excessive.

3747. (Refer to figure 28.) What is the total landing distance over a 50-foot obstacle?

Temperature..... 50° F
Pressure altitude..... 4,000 ft
Weight..... 3,000 lb
Headwind..... 22 kts

- 1—1,250 feet.
- 2—1,175 feet.
- 3—1,050 feet.
- 4—975 feet.

3748. (Refer to figure 28.) Determine the approximate ground roll.

Temperature..... 85° F
Pressure altitude..... 6,000 ft
Weight..... 2,800 lb
Headwind..... 14 kts

- 1—1,480 feet.
- 2—1,280 feet.
- 3—742 feet.
- 4—634 feet.

3749. (Refer to figure 28.) What is the total landing distance over a 50-foot obstacle?

Temperature..... 90° F
Pressure altitude..... 2,000 ft
Weight..... 3,400 lb
Headwind..... 10 kts

- 1—1,725 feet.
- 2—1,650 feet.
- 3—1,575 feet.
- 4—1,475 feet.

3750. (Refer to figure 28.) Determine the approximate ground roll.

Temperature..... 60° F
Pressure altitude..... 8,000 ft
Weight..... 3,200 lb
Headwind..... 18 kts

- 1—1,500 feet.
- 2—1,050 feet.
- 3—795 feet.
- 4—650 feet.

3751. How does increased weight affect the takeoff distance of an airplane?

- 1—Every airplane has the same acceleration factor under the same atmospheric conditions, but a higher airspeed is needed to produce the additional lift required.
- 2—Every airplane has the same acceleration factor with the same power output, but a higher airspeed is needed to overcome the increased ground effect.
- 3—The airplane will accelerate more slowly with the same power output, and a higher airspeed is required to generate necessary lift for takeoff.
- 4—The airplane will accelerate more slowly with the same power output, but the same airspeed is required to generate necessary lift for takeoff.

3752. An airplane is loaded with the CG aft of the aft limit. What effect will this have on controllability?

- 1—Stall and spin recovery may be difficult or impossible.
- 2—A stall will occur at a higher indicated airspeed due to the greater down loading on the elevator.
- 3—A power-off, full-stall landing is more difficult because of the increased ground effect on the elevator.
- 4—A stall will occur at a lower airspeed, but recovery will be easier because of reduced wing loading.

3753. The stalling speed of an aircraft will be highest when the aircraft is loaded with a

- 1—higher gross weight and aft CG.
- 2—low gross weight and forward CG.
- 3—low gross weight and aft CG.
- 4—high gross weight and forward CG.

3754. An airplane is loaded with the CG at the aft limit. What are the performance characteristics compared with the CG at the forward limit?

- 1—The aft CG provides the highest stall speed and cruising speed.
- 2—The aft CG provides the lowest stalling speed, the highest cruising speed, and least stability.
- 3—Stalling speed and pitch stability are the only factors affected by CG location.
- 4—Cruising speed is lower because of more induced drag created by the elevator or stabilizer being required to provide more lift with an aft CG.

3755. If the CG of an airplane is moved from the aft limit to beyond the forward limit, how will it affect the cruising and stalling speed?

- 1—Increase the cruising speed and decrease the stalling speed.
- 2—Decrease the cruising speed and increase the stalling speed.
- 3—Increase both the cruising speed and stalling speed.
- 4—Decrease both the cruising speed and stalling speed.

3756. When an aircraft's forward CG limit is exceeded, it will affect the flight characteristics of the aircraft by producing

- 1—very light elevator control forces which make it easy to inadvertently overstress the aircraft.
- 2—decreased stability and greater ease in establishing the proper landing and takeoff attitude.
- 3—improved performance since it reduces the induced drag.
- 4—higher stalling speeds and more longitudinal stability.

3757. As the CG moves aft, an airplane becomes

- 1—more stable, yet more difficult to control.
- 2—less stable, yet easier to control.
- 3—less stable and less controllable.
- 4—more stable and controllable as long as the aft CG is not exceeded.

3758. What is characteristic of the indicated airspeed if the CG is at the most forward allowable position and constant power and altitude are maintained?

- 1—Indicated airspeed will be greater than it would be with the CG in the most rearward allowable position.
- 2—Indicated airspeed will be less than it would be with the CG in the most rearward allowable position.
- 3—There is no relationship between CG location and indicated airspeed.
- 4—indicated airspeed will be less than it would be at the most rearward CG position, but not less than it would be with the CG midway between the forward and aft limits.

3759. To maintain level cruising flight in an airplane which is loaded with the CG at the forward limit, an additional download must be imposed on the horizontal stabilizer. This in turn produces

- 1—an additional load which the wing must support.
- 2—a lesser load that must be supported by the wing.
- 3—a decrease in drag and results in a faster airspeed.
- 4—a decrease in drag and reduces the stalling speed.

3760. Under which condition is a forward CG most critical?

- 1—On landing.
- 2—On takeoff.
- 3—During a spin.
- 4—When in an unusual attitude.

3761. As the CG location is changed, recovery from a stall becomes progressively

- 1—less difficult as the CG moves rearward.
- 2—more difficult as the CG moves either forward or rearward.
- 3—less difficult as the CG moves either forward or rearward.
- 4—more difficult as the CG moves rearward.

3762. If the CG is located aft of allowable limits, the pilot may find it impossible to

- 1—fly in the lower allowable airspeed range due to insufficient aft cyclic control.
- 2—raise the nose, if necessary, during flight in gusty wind conditions.
- 3—recognize this out-of-balance condition when hovering in strong headwinds.
- 4—fly in the upper allowable airspeed range due to insufficient forward cyclic control.

3763. While hovering immediately after liftoff, an excessive amount of forward cyclic stick is required to maintain the desired position over the ground. If a takeoff is made and flight continued, this situation will be

- 1—improved if the fuel tanks are located forward of the CG.
- 2—aggravated if the fuel tanks are located aft of the CG.
- 3—unimproved regardless of the location of the fuel tanks.
- 4—aggravated if the fuel tanks are located forward of the CG.

3764. A helicopter is loaded in such a manner that the CG is located aft of the aft allowable CG limit. Which statement is true about this hazardous situation?

- 1—Should the helicopter pitchup due to gusty winds during high-speed flight, there may not be sufficient forward cyclic control available to lower the nose.
- 2—This condition would become more hazardous as fuel is consumed, if the main fuel tank is located aft of the rotor mast.
- 3—In case of an autorotation, sufficient aft cyclic control may not be available to flare properly.
- 4—This out-of-balance situation would be easily recognized when hovering in a strong headwind.

3765. If the nosewheel of an airplane moves aft during gear retraction, how would this aft movement affect the CG location of that airplane? It would

- 1—have no effect on the CG location.
- 2—cause the CG location to move aft.
- 3—cause the CG location to move forward.
- 4—cause the CG location to move, but the direction of movement would be unpredictable.

3766. If the landing gear on an airplane moves forward during retraction, the

- 1—total moments will decrease.
- 2—total moments will remain the same.
- 3—total moments will increase.
- 4—center of gravity will remain the same.

3767. The center of gravity of an aircraft is computed along the

- 1—lateral axis.
- 2—vertical axis.
- 3—longitudinal axis.
- 4—horizontal axis.

3768. The center of gravity of an aircraft can be determined by

- 1—multiplying total weight by total moments.
- 2—dividing total arms by total moments.
- 3—dividing total moments by total weight.
- 4—multiplying total arms by total weight.

3769. (Refer to figure 29.) How should the 1,000-pound weight be shifted to balance the plank on the fulcrum?

- 1—15 inches to the right.
- 2—15 inches to the left.
- 3—5 inches to the right.
- 4—5 inches to the left.

3770. (Refer to figure 29.) How should the 500-pound weight be shifted to balance the plank on the fulcrum?

- 1—10 inches to the right.
- 2—10 inches to the left.
- 3—30 inches to the right.
- 4—30 inches to the left.

3771. (Refer to figure 30.) How should the 250-pound weight be shifted to balance the plank on the fulcrum?

- 1—2 inches to the left.
- 2—2 inches to the right.
- 3—2.5 inches to the left.
- 4—2.5 inches to the right.

3772. (Refer to figure 30.) How should the 200-pound weight be shifted to balance the plank on the fulcrum?

- 1—2 inches to the left.
- 2—2 inches to the right.
- 3—2.5 inches to the left.
- 4—2.5 inches to the right.

3773. (Refer to figure 31.) How should the 500-pound weight be shifted to balance the plank on the fulcrum?

- 1—1 inch to the left.
- 2—1 inch to the right.
- 3—4.5 inches to the left.
- 4—4.5 inches to the right.

3774. (Refer to figure 31.) How should the 250-pound weight be shifted to balance the plank on the fulcrum?

- 1—8.4 inches to the right.
- 2—8.4 inches to the left.
- 3—2 inches to the right.
- 4—2 inches to the left.

3775. (Refer to figure 32.) If 50 pounds of weight is located at point X and 100 pounds at point Z, how much weight must be located at point Y to balance the plank?

- 1—30 pounds.
- 2—50 pounds.
- 3—300 pounds.
- 4—500 pounds.

3776. (Refer to figure 32.) If 50 pounds of weight is located at point X and 100 pounds at point Y, how much weight must be located at point Z to balance the plank?

- 1—50 pounds.
- 2—100 pounds.
- 3—150 pounds.
- 4—500 pounds.

3777. (Refer to figure 32.) If 50 pounds of weight are located at points X, Y, and Z, how would point Z have to be shifted to balance the plank?

- 1—2.5 inches to the left.
- 2—2.5 inches to the right.
- 3—25 inches to the left.
- 4—25 inches to the right.

3778. GIVEN:

Weight A.....120 lb at 15" aft of datum
 Weight B.....200 lb at 117" aft of datum
 Weight C.....75 lb at 195" aft of datum

Based on this information, the CG would be located how far aft of datum?

- 1—82.0 inches.
- 2—109.0 inches.
- 3—121.7 inches.
- 4—100.8 inches.

3779. GIVEN:

Weight D.....160 lb at 45" aft of datum
 Weight E.....170 lb at 145" aft of datum
 Weight F.....105 lb at 185" aft of datum

Based on this information, where would the center of gravity be located?

- 1—86.0" aft of datum.
- 2—117.8" aft of datum.
- 3—125.0" aft of datum.
- 4—136.7" aft of datum.

3780. GIVEN:

Weight X.....130 lb at 17" aft of datum.
 Weight Y.....110 lb at 110" aft of datum.
 Weight Z.....75 lb at 210" aft of datum.

Based on this information, the CG would be located how far aft of datum?

- 1—89.1 inches.
- 2—95.4 inches.
- 3—106.9 inches.
- 4—112.3 inches.

3781. GIVEN:

Total weight.....2,900 lb
 CG location.....Station 115.0
 Aft CG limit.....Station 116.0

The maximum weight that could be added at Station 130.0 without exceeding the aft CG limit would be

- 1—317 pounds.
- 2—207 pounds.
- 3—140 pounds.
- 4—14 pounds.

3782. GIVEN:

Total weight.....2,340 lb
 CG location.....Station 103.0

What would be the new CG location if 135 pounds of weight were added at Station 109.0?

- 1—Station 102.7.
- 2—Station 103.3.
- 3—Station 104.2.
- 4—Station 109.3.

3783. GIVEN:

Aircraft weight.....8,300 lb
 CG location.....Station 90.0
 Aft CG limit.....Station 90.5

How much weight could be added at Station 160 without exceeding the aft CG limit?

- 1—13.9 pounds.
- 2—16.5 pounds.
- 3—59.7 pounds.
- 4—69.5 pounds.

3784. GIVEN:

Aircraft weight.....9,500 lb
 CG location.....Station 90.0
 Aft CG limit.....Station 90.5

How much weight could be added at Station 120 without exceeding the aft CG limit?

- 1—30.0 pounds.
- 2—61.0 pounds.
- 3—110.5 pounds.
- 4—161.0 pounds.

3785. GIVEN:

Aircraft weight.....5,000 lb
 CG location.....Station 80.0
 Aft CG limit.....Station 80.5

What is the maximum weight that could be added at Station 150.0 without exceeding the aft CG limit?

- 1—35.9 pounds.
- 2—69.5 pounds.
- 3—70.0 pounds.
- 4—160.5 pounds.

3786. GIVEN:

Aircraft weight.....6,230 lb
 CG location.....Station 79

What is the location of the CG if 90 pounds are removed from Station 140?

- 1—79.9.
- 2—78.1.
- 3—80.1.
- 4—77.9.

3787. GIVEN:

Aircraft weight.....7,152 lb
 CG location.....Station 82

What is the location of the CG if 146 pounds are removed from Station 150?

- 1—83.4.
- 2—82.7.
- 3—81.3.
- 4—80.6.

3788. GIVEN:

Aircraft weight.....8,420 lb
CG location.....Station 85

What is the location of the CG if 60 pounds are removed from Station 70?

- 1—94.3.
- 2—85.1.
- 3—84.9.
- 4—84.1.

3789. GIVEN:

Total weight.....7,500 lb
CG location.....Station 80.5
Aft CG limit.....Station 79.5

How much weight must be shifted from Station 150.0 to Station 30.0 to move the CG to exactly the aft CG limit?

- 1—62.5 pounds.
- 2—65.8 pounds.
- 3—68.9 pounds.
- 4—73.5 pounds.

3790. GIVEN:

Total weight.....2,800 lb
CG location.....Station 120.0
Forward CG limit.....Station 117.0

Could 100 pounds of weight be shifted from Station 130.0 to Station 30.0 without exceeding the forward CG limit?

- 1—No, the new CG would be located at Station 116.42.
- 2—No, the new CG would be located at Station 116.89.
- 3—Yes, the new CG would be located at Station 117.89.
- 4—Yes, the new CG would remain at Station 120.0.

3791. GIVEN:

Total weight.....4,750 lb
CG location.....Station 115.8
Aft CG limit.....Station 118.0

Could 100 pounds of weight be shifted from Station 30.0 to Station 120.0 without exceeding the aft CG limit?

- 1—Yes, the CG would remain at Station 115.8.
- 2—Yes, the new CG would be located at Station 117.69.
- 3—No, the new CG would be located at Station 118.15.
- 4—No, the new CG would be located at Station 118.25.

3792. GIVEN:

Empty weight (oil is included).....2,260.0 lb
Empty weight moment.....93.2 lb-in
Pilot and front seat passenger.....400 lb
Center passengers.....400 lb
Aft passengers.....340 lb
Baggage.....120 lb
Fuel.....89 gal

(Refer to figure 33.) Is the airplane loaded within limits?

- 1—No, the weight exceeds the maximum allowable by 254 pounds, and the CG is aft of the aft limit.
- 2—No, the weight is acceptable, but the CG is aft of the aft limit.
- 3—Yes, the weight and CG would be within limits after 254 pounds of fuel were consumed.
- 4—Yes, the weight and CG location is acceptable.

3793. GIVEN:

Empty weight (oil included).....2,260.0 lb
Empty weight moment.....93.2 lb-in
Pilot and front seat passenger.....380 lb
Center passengers.....240 lb
Aft passengers.....220 lb
Baggage.....120 lb
Fuel.....75 gal

Under the conditions listed above and using figure 33, the CG is determined to be located

- 1—within the CG envelope.
- 2—on the forward limit of the CG envelope.
- 3—on the aft limit of the CG envelope.
- 4—within the shaded area of the CG envelope.

3794. GIVEN:

Empty weight moment.....99.7 lb-in
Empty weight (oil not included).....2,288.0 lb
Oil.....8 qt
Oil Moment.....-0.2
Pilot and front seat passenger.....330.0 lb
Center passengers.....290 lb
Aft passengers.....170 lb
Baggage.....120 lb
Fuel.....70 gal

(Refer to figure 33.) If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 60.0 gallons of fuel have been used during flight?

- 1—Weight 3,618.0 pounds; moment 168.8.
- 2—Weight 3,618.0 pounds; moment 184.5.
- 3—Weight 3,273.0 pounds; moment 168.8.
- 4—Weight 3,273.0 pounds; moment 184.5.

3795. GIVEN:

Empty weight (oil is included).....	2,276.0 lb
Empty weight moment.....	90.2 lb-in
Pilot and front seat passenger.....	400 lb
Center passengers.....	200 lb
Aft passengers.....	175 lb
Baggage.....	35 lb
Fuel.....	80 gal

(Refer to figure 33.) If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 70.0 gallons of fuel have been used during flight?

- 1—3,131 pounds and 142.7 pound-inch.
- 2—3,146 pounds and 144.7 pound-inch.
- 3—3,566 pounds and 162.7 pound-inch.
- 4—3,986 pounds and 180.6 pound-inch.

3796. GIVEN:

Front seat—pilot and passenger.....	375 lb
Rear seat—passengers (aft position).....	245 lb
Baggage.....	65 lb
Fuel.....	70 gal

Using the data in figure 34 the airplane is determined to be

- 1—185 pounds under allowable gross weight; the CG is located within limits.
- 2—162 pounds under allowable gross weight; the CG is located within limits.
- 3—162 pounds under allowable gross weight; the CG is located aft of the aft limit.
- 4—692 pounds under allowable gross weight; the CG is located within limits.

3797. Refer to the loading data in figure 34. What would be the maximum allowable inches aft of datum center of gravity moment if the airplane was loaded to 3,400 pounds gross weight?

- 1—77.0 inches.
- 2—82.0 inches.
- 3—84.5 inches.
- 4—85.8 inches.

3798. GIVEN:

Front seat—pilot and passenger.....	400 lb
Rear seat—passengers (aft position).....	240 lb
Baggage.....	20 lb
Fuel.....	75 gal

(Refer to figure 34.) The airplane is determined to be

- 1—157 pounds under allowable gross weight, but the CG is located aft of the aft limit.
- 2—157 pounds under allowable gross weight; the CG is located within limits.
- 3—180 pounds under allowable gross weight; the CG is located within limits.
- 4—180 pounds under allowable gross weight, but the CG is located aft of the aft limit.

3799. Refer to the loading data, figure 34; an airplane is loaded as follows:

Front

1st person.....	160 lb
2nd person.....	156 lb

Rear (aft position)

1st person.....	130 lb
2nd person.....	147 lb

Baggage.....	50 lb
Fuel Leading edge tanks.....	75 gal

From the data given, the airplane is loaded

- 1—156 pounds under allowable gross weight; CG 84" aft of datum.
- 2—163 pounds under allowable gross weight; CG 82" aft of datum.
- 3—197 pounds under allowable gross weight; CG 84.5" aft of datum.
- 4—197 pounds under allowable gross weight; CG located outside aft limits.

3800. What hazards to aircraft may exist in warning areas and where are the warning areas located?

- 1—Unusual, often invisible, hazards such as aerial gunnery or guided missiles over international waters.
- 2—Unusual, often invisible, hazards such as artillery firing or missiles over military reservations.
- 3—Known wind shear areas in canyons and mountainous areas during certain seasons.
- 4—Student training areas or parachute jumping areas in or near heavily populated areas.

3801. Where are warning areas established?

- 1—In mountainous areas.
- 2—Beyond the nation's 3-mile limit.
- 3—Surrounding large metropolitan cities.
- 4—In the vicinity of military bases.

3802. Airspace established as warning areas are located

- 1—in international airspace.
- 2—in the immediate vicinity of military bases.
- 3—where hazardous terrain exists.
- 4—along military low-altitude training routes.

3803. Flight through a restricted area should not be accomplished unless the pilot has

- 1—filed a VFR flight plan.
- 2—received prior permission from the commanding officer of the nearest military base.
- 3—an aircraft that is transponder equipped.
- 4—received prior authorization from the controlling agency.

3804. If a military training route will have flights operating at or below 1,500 feet AGL it will be designated by

- 1—IR or VR and a four digit number.
- 2—IR or VR and a three digit number.
- 3—IR and a four digit number only.
- 4—VR and a three digit number only.

3805. IFR military training routes are usually flown from

- 1—the surface up to, and including, 1,500 feet AGL.
- 2—at or above 1,500 feet AGL to 5,000 feet AGL.
- 3—above 1,500 feet AGL to 10,000 feet MSL.
- 4—above 1,500 feet AGL to 18,000 feet MSL.

3806. Which chart depicts IFR and VFR military training routes regardless of altitude?

- 1—World Aeronautical Chart.
- 2—IFR Planning Chart.
- 3—IFR Low Altitude En Route Chart.
- 4—Sectional Aeronautical Chart.

3807. (Refer to figure 35.) What is the normal radius from the airport of the outer area, circle B?

- 1—10 NM.
- 2—15 NM.
- 3—20 NM.
- 4—25 NM.

3808. (Refer to figure 35.) What is the radius from the airport of the inner circle, circle C?

- 1—3 miles.
- 2—5 miles.
- 3—7 miles.
- 4—10 miles.

3809. (Refer to figure 35.) What is the radius from the airport of the outer circle, circle A?

- 1—3 miles.
- 2—5 miles.
- 3—10 miles.
- 4—15 miles.

3810. (Refer to figure 35.) Which altitude (box 2) is applicable to the base of the outer circle?

- 1—500 feet AGL.
- 2—700 feet AGL.
- 3—1,000 feet AGL.
- 4—1,200 feet AGL.

3811. (Refer to figure 35.) Which altitude (box 1) is applicable to the vertical extent of the inner and outer circles?

- 1—1,200 feet AGL.
- 2—3,000 feet AGL.
- 3—3,000 feet above airport.
- 4—4,000 feet above airport.

3812. What minimum aircraft equipment is required for operation within the ARSA?

- 1—Two-way communications.
- 2—Two-way communications and transponder.
- 3—Two-way communications, transponder, and DME.
- 4—Transponder and DME.

3813. To operate an aircraft from a satellite airport within an Airport Radar Service Area (ARSA), the pilot must

- 1—file a flight plan prior to departure.
- 2—monitor ATC until clear of the ARSA.
- 3—contact ATC as soon as practicable after takeoff.
- 4—secure prior approval from ATC before takeoff at the airport.

3814. All operations within an Airport Radar Service Area (ARSA) must

- 1—be conducted under instrument flight rules.
- 2—be in compliance with ATC clearances and instructions.
- 3—be in an aircraft equipped with a 4096 transponder with Mode C capability.
- 4—be on a flight plan filed prior to arrival or departure.

3815. MOA's consist of airspace of defined vertical and lateral limits and are established for the purpose of

- 1—military services conducting VFR low altitude navigation, tactical training, and flight testing.
- 2—separating certain military training activities from IFR traffic.
- 3—providing separation of VFR and IFR civil aircraft from military aircraft.
- 4—denoting the existence of unusual hazards to aircraft, such as artillery firing, aerial gunnery, or guided missiles.

3816. When operating VFR in an MOA, a pilot

- 1—must obtain a clearance from the controlling agency prior to entering the MOA.
- 2—may operate only on the airways that transverse the MOA.
- 3—should exercise extreme caution when military activity is being conducted.
- 4—must operate only when military activity is not being conducted.

3817. The purpose of designating certain airspace as a transition area is to

- 1—ensure that IFR flights can remain within controlled airspace for terminal operations.
- 2—enable ATC to control all flights within a given area.
- 3—separate a control zone from a control area.
- 4—extend the lateral limits of a control zone.

3818. When designated in conjunction with an airport which has a published instrument approach procedure, what airspace is defined as a transition area?

- 1—That airspace extending upward from 700 feet or more AGL and terminating at the base of the overlying controlled airspace.
- 2—That airspace extending upward from the surface and terminating at the base of the overlying Continental Control Area.
- 3—The airspace extending upward from the surface to 3,000 feet within a 5 SM radius from the center of an airport.
- 4—Areas that are designated as Terminal Control Areas for which all aircraft are subject to the operating rules of FAR Part 91.

3819. Radar service available under the terminal radar program for VFR aircraft provides

- 1—separation between all VFR and IFR aircraft within the TRSA.
- 2—traffic information and positive control of all aircraft within the TCA.
- 3—traffic information and headings to fly to join the traffic pattern or to a position behind the preceding aircraft in the approach sequence.
- 4—traffic information and limited vectoring to VFR aircraft on a workload permitting basis.

3820. Stage III service within a TRSA utilizes radar to provide

- 1—separation between all VFR aircraft operating within the TRSA.
- 2—radar vectoring if the weather minimums are below VFR conditions.
- 3—separation between IFR aircraft, because VFR aircraft are not permitted in the area.
- 4—separation between all participating VFR aircraft and IFR aircraft operating within the TRSA.

3821. Within the conterminous United States, the floor of the Positive Control Area is

- 1—10,000 feet MSL.
- 2—14,500 feet MSL.
- 3—18,000 feet MSL.
- 4—24,000 feet MSL.

3822. With certain exceptions, the Continental Control Area extends upward from

- 1—the surface.
- 2—10,000 feet MSL.
- 3—14,500 feet MSL.
- 4—18,000 feet MSL.

3823. Airport Traffic Areas normally extend from the surface up to but not including

- 1—3,000 feet above the surface surrounding the airport and have the same horizontal limits of the associated control zone.
- 2—3,000 feet above the airport and have a radius of 5 SM.
- 3—the base of the Continental Control Area and have a radius of 10 SM.
- 4—the upper limit of the associated control zones and have a radius of 5 SM with extensions as necessary for instrument approaches.

3824. An Airport Traffic Area extends upward to, but does not include

- 1—2,000 feet MSL.
- 2—2,000 feet AGL.
- 3—3,000 feet MSL.
- 4—3,000 feet AGL.

3825. Airport Traffic Areas are in effect at all airports where

- 1—the airport is located within the lateral limits of controlled airspace.
- 2—a control tower is in operation.
- 3—an FSS is in operation.
- 4—a control zone is in effect.

3826. Control areas within the contiguous United States extend upward from either 700 feet or 1,200 feet above the surface to, but not including

- 1—3,000 feet MSL.
- 2—18,000 feet MSL.
- 3—24,000 feet MSL.
- 4—the base of the Continental Control Area.

3827. Within the contiguous United States, the vertical limit of control zones extends from the surface upward to,

- 1—but not including 3,000 feet AGL.
- 2—but not including 10,000 feet MSL.
- 3—the base of the Continental Control Area.
- 4—infinity.

3828. One of the major differences between control zones and control areas is that all control zones

- 1—begin at the surface, while all control areas begin at an altitude of 700 feet or higher above the surface.
- 2—always begin at 700 feet AGL while control areas always begin at 1,200 feet above the surface.
- 3—are located around tower-controlled airports only.
- 4—have higher basic VFR weather minimums than control areas.

3829. How is a control zone depicted on Sectional Aeronautical Charts?

- 1—A blue airport symbol.
- 2—A blue dashed line encircling the airport.
- 3—The letters CT in the airport data box.
- 4—A magenta colored band surrounding the airport.

3830. Unless otherwise specified, Federal airways extend from

- 1—the surface upward to 18,000 feet MSL and are 4 NM wide.
- 2—1,200 feet above the surface upward to 14,500 feet MSL and are 16 NM wide.
- 3—700 feet above the surface upward to the Continental Control Area and are 10 NM wide.
- 4—1,200 feet above the surface upward to 18,000 feet MSL and are 8 NM wide.

3831. Airport advisory areas exist only at airports with

- 1—operating control towers.
- 2—operating FSS's.
- 3—radar approach and departure service.
- 4—automatic terminal information service.

3832. What is an airport advisory area?

- 1—That airspace within 5 SM of an airport extending up to, but does not include 3,000 feet, within which a control tower is in operation.
- 2—That airspace within 10 SM of an airport which does not have a control tower but where an FSS is located.
- 3—That airspace identified by an area on the surface within which flight of an aircraft is subject to special restrictions.
- 4—The airspace which extends upward from the surface and terminates at the base of the Continental Control Area.

3833. Sectional charts for the conterminous United States are updated each

- 1—3 months.
- 2—6 months.
- 3—12 months.
- 4—24 months.

3834. Which of the following statements about longitude and latitude is true?

- 1—Lines of longitude cross the Equator at right angles.
- 2—Lines of latitude are drawn from the North Pole to the South Pole.
- 3—The 0° line of latitude passes through Greenwich, England.
- 4—Lines of longitude are parallel to the Equator.

3835. When planning a distance flight, true course measurements on a Sectional Aeronautical Chart should be made at a meridian near the midpoint of the course because the

- 1—angles formed by lines of longitude and the course line vary from point to point.
- 2—angles formed by isogonic lines and lines of latitude vary from point to point.
- 3—values of isogonic lines change from point to point.
- 4—geographic North Pole from which direction is measured is not located at the magnetic North Pole.

3836. When diverting to an alternate airport because of an emergency, pilots should

- 1—complete all plotting, measuring, and computations involved before diverting.
- 2—climb to a higher altitude because it will be easier to identify checkpoints.
- 3—apply rule-of-thumb computations, estimates, and other appropriate shortcuts to divert to the new course as soon as possible.
- 4—rely upon radio as the primary method of navigation.

3837. The line from point A to point B of the wind triangle in figure 36 represents

- 1—true course and groundspeed.
- 2—true heading and airspeed.
- 3—wind direction and velocity.
- 4—groundspeed and true heading.

3838. The line from point B to point C of the wind triangle in figure 36 represents

- 1—true heading and groundspeed.
- 2—wind direction and velocity.
- 3—airspeed and heading.
- 4—groundspeed and true course.

3839. The line from point C to point A of the wind triangle in figure 36 represents

- 1—true course and groundspeed.
- 2—wind direction and velocity.
- 3—airspeed and true heading.
- 4—true heading and groundspeed.

3840. When converting from true course to magnetic heading a pilot should

- 1—subtract easterly variation and right wind correction angle.
- 2—subtract westerly variation and add right wind correction angle.
- 3—add westerly variation and subtract left wind correction angle.
- 4—add easterly variation and left wind correction angle.

3841. When converting from magnetic course to true course a pilot should

- 1—subtract westerly variation only when on headings of 090° and 270°.
- 2—subtract easterly variation when on a heading of 360°.
- 3—add easterly variation regardless of heading.
- 4—add westerly variation regardless of heading.

3842. When converting from true heading to true course the pilot should

- 1—add right wind correction angle.
- 2—subtract left wind correction angle.
- 3—add left deviation correction angle.
- 4—subtract right wind correction angle.

3843. The angular difference between true north and magnetic north is

- 1—compass acceleration error.
- 2—magnetic deviation.
- 3—magnetic variation.
- 4—compass dip error.

3844. GIVEN:

Departure path..... straight out
 Takeoff time..... 1030 DST
 Winds during climb..... 180° at 30 kts
 True course during climb..... 160°
 Airport elevation..... 1,500 ft
 True airspeed..... 125 kts
 Rate of climb..... 500 ft/min

What would be the distance and time upon reaching 8,500 feet MSL?

- 1—20 NM and 1047 DST.
- 2—23 NM and 1044 DST.
- 3—25 NM and 1047 DST.
- 4—30 NM and 1044 DST.

3845. GIVEN:

Departure path..... straight out
 Takeoff time..... 1435Z
 Winds during climb..... 175° at 25 kts
 True course during climb..... 155°
 Airport elevation..... 2,000 ft
 True airspeed..... 130 kts
 Rate of climb..... 500 ft/min

What would be the distance and time upon reaching 8,000 feet MSL?

- 1—21 NM and 1447Z.
- 2—24 NM and 1452Z.
- 3—27 NM and 1455Z.
- 4—30 NM and 1500Z.

3846. GIVEN:

Distance..... 340 SM
 True course..... 260°
 Wind..... 245° at 45 kts
 True airspeed..... 135 MPH
 Rate of fuel consumption..... 12.7 gal/hr

What would be the approximate groundspeed and amount of fuel consumed?

- 1—90 MPH; 47.3 gallons.
- 2—74 knots; 50.1 gallons.
- 3—84 MPH; 51.2 gallons.
- 4—80 knots; 55.3 gallons.

3847. GIVEN:

Distance..... 200 SM
 True course..... 320°
 Wind..... 215° at 25 kts
 True airspeed..... 128 MPH
 Rate of fuel consumption..... 19 gal/hr

What would be the approximate groundspeed and amount of fuel consumed?

- 1—117 knots; 27.3 gallons.
- 2—132 MPH; 28.9 gallons.
- 3—127 MPH; 33.3 gallons.
- 4—115 knots; 31.5 gallons.

3848. GIVEN:

Usable fuel at takeoff..... 36 gal
 Fuel consumption rate..... 12.4 gal/hr
 Constant groundspeed..... 140 kts
 Flight time since takeoff..... 48 min

Based on the above information, how much farther can an airplane under day VFR be flown according to FAR Part 91?

- 1—406 NM.
- 2—294 NM.
- 3—224 NM.
- 4—189 NM.

3849. GIVEN:

Usable fuel at takeoff..... 36 gal
 Fuel consumption rate..... 12.4 gal/hr
 Constant groundspeed..... 140 kts
 Flight time since takeoff..... 48 min

Based on the above information, how much farther can an airplane under night VFR be flown according to FAR Part 91?

- 1—189 NM.
- 2—224 NM.
- 3—248 NM.
- 4—294 NM.

3850. GIVEN:

Usable fuel at takeoff..... 36 gal
 Fuel consumption rate..... 12.4 gal/hr
 Constant groundspeed..... 140 kts
 Flight time since takeoff..... 48 min

Based on the above information, how much farther can a rotorcraft under VFR be flown according to FAR Part 91?

- 1—294 NM.
- 2—247 NM.
- 3—224 NM.
- 4—189 NM.

3851. GIVEN:

Usable fuel at takeoff..... 40 gal
 Fuel consumption rate..... 12.2 gal/hr
 Constant groundspeed..... 120 kts
 Flight time since takeoff..... 1 hr 30 min

Based on the above information, how much farther can an airplane under day VFR be flown according to FAR Part 91?

- 1—176 NM.
- 2—156 NM.
- 3—121 NM.
- 4—96 NM.

3852. GIVEN:

Usable fuel at takeoff.....40 gal
Fuel consumption rate..... 12.2 gal/hr
Constant groundspeed..... 120 kts
Flight time since takeoff..... 1 hr 30 min

Based on the above information, how much farther can an airplane under night VFR be flown according to FAR Part 91?

- 1—121 NM.
- 2—156 NM.
- 3—176 NM.
- 4—216 NM.

3853. GIVEN:

Usable fuel at takeoff.....40 gal
Fuel consumption rate..... 12.2 gal/hr
Constant groundspeed..... 120 kts
Flight time since takeoff..... 1 hr 30 min

Based on the above information, how much farther can a rotorcraft under day VFR be flown according to FAR Part 91?

- 1—215 NM.
- 2—176 NM.
- 3—121 NM.
- 4—96 NM.

3854. If fuel consumption is 15.3 GPH and groundspeed is 167 knots, how much fuel is required for an aircraft to travel 620 NM?

- 1—66 gallons.
- 2—63 gallons.
- 3—60 gallons.
- 4—57 gallons.

3855. If an aircraft is consuming 80 pounds of fuel per hour at a cruising altitude of 6,500 feet and the groundspeed is 180 knots, how much fuel is required to travel 610 NM?

- 1—304 pounds.
- 2—295 pounds.
- 3—285 pounds.
- 4—271 pounds.

3856. If an aircraft is consuming 91 pounds of fuel per hour at a cruising altitude of 6,500 feet and the groundspeed is 168 knots, how much fuel is required to travel 457 NM?

- 1—248 pounds.
- 2—265 pounds.
- 3—291 pounds.
- 4—391 pounds.

3857. If an aircraft is consuming 11.5 gallons of fuel per hour at a cruising altitude of 8,500 feet and the groundspeed is 155 knots, how much fuel is required to travel 445 NM?

- 1—26 gallons.
- 2—28 gallons.
- 3—30 gallons.
- 4—33 gallons.

3858. On a cross-country flight, point C is crossed at 0900 hours and the plan is to reach point D at 0925 hours. Use the following information to determine the indicated airspeed required to reach point D on schedule.

Distance between C and D..... 68 NM
Forecast wind..... 295° at 25 kts
Pressure altitude..... 7,000 ft
Ambient temperature..... +10° C
True course..... 175°

The required indicated airspeed would be approximately

- 1—135 knots.
- 2—144 knots.
- 3—166 knots.
- 4—172 knots.

3859. On a cross-country flight, point A is crossed at 1500 hours and the plan is to reach point B at 1530 hours. Use the following information to determine the indicated airspeed required to reach point B on schedule

Distance between A and B.....70 NM
Forecast wind..... 310° at 15 kts
Pressure altitude..... 8,000 ft
Ambient temperature..... -10° C
True course..... 270°

The required indicated airspeed would be approximately

- 1—126 knots.
- 2—137 knots.
- 3—152 knots.
- 4—168 knots.

3860. On a cross-country flight, point X is crossed at 1015 and arrival at point Y is expected at 1025. Use the following information to determine the indicated airspeed required to reach point Y on schedule.

Distance between X and Y.....27 NM
Forecast wind..... 240° at 30 kts
Pressure altitude..... 5,500 ft
Ambient temperature..... +05° C
True course..... 100°

The required indicated airspeed would be approximately

- 1—128 knots.
- 2—140 knots.
- 3—162 knots.
- 4—171 knots.

3861. On a cross-country flight, point X is crossed at 1550 and the plan is to reach point Y at 1620. Use the following information to determine the indicated airspeed required to reach point Y on schedule.

Distance between X and Y.....70 NM
 Forecast wind.....115° at 25 kts
 Pressure altitude.....9,000 ft
 Ambient temperature.....-05° C
 True course.....088°

The required indicated airspeed would be approximately

- 1—138 knots.
- 2—143 knots.
- 3—162 knots.
- 4—184 knots.

3862. GIVEN:

Groundspeed.....155 kts
 Elapsed time.....2 min

What is the distance traveled?

- 1—2.58 NM.
- 2—3.10 NM.
- 3—5.16 NM.
- 4—6.32 NM.

3863. If the groundspeed is 215 knots, how far will the aircraft travel in 3 minutes elapsed time?

- 1—1.28 NM.
- 2—3.58 NM.
- 3—6.45 NM.
- 4—10.75 NM.

3864. How far will an aircraft travel in 3-1/2 minutes if its groundspeed is 165 knots?

- 1—1.3 NM.
- 2—9.6 NM.
- 3—12.8 NM.
- 4—28.2 NM.

3865. After 141 miles are flown from the departure point, the aircraft's position is located 11 miles off course. If 71 miles remain to be flown, what approximate total correction should be made to converge on the destination?

- 1—4°.
- 2—8°.
- 3—11°.
- 4—14°.

3866. After 150 miles are flown from the departure point, the aircraft's position is located 8 miles off course. If 160 miles remain to be flown, what approximate total correction should be made to converge on the destination?

- 1—3°.
- 2—6°.
- 3—9°.
- 4—12°.

3867. After 155 miles are flown from the departure point, the aircraft's position is located 10 miles off course. If 80 miles remain to be flown, what approximate total correction should be made to converge on the destination?

- 1—4°.
- 2—8°.
- 3—11°.
- 4—14°.

3868. After 240 miles are flown from the departure point, the aircraft's position is located 25 miles off course. If 100 miles remain to be flown, what approximate total correction should be made to converge on the destination?

- 1—4°.
- 2—15°.
- 3—21°.
- 4—30°.

3869. GIVEN:

True course.....258°
 Variation.....10° E.
 Indicated airspeed.....142 kts
 Ambient temperature.....+05° C
 Pressure altitude.....6,500 ft
 Forecast wind.....350° at 30 kts

Under these conditions, the magnetic heading and ground-speed would be approximately

- 1—236° and 157 knots.
- 2—270° and 157 knots.
- 3—260° and 155 knots.
- 4—280° and 155 knots.

3870. GIVEN:

True course.....330°
 Variation.....15° E.
 Indicated airspeed.....160 kts
 Ambient temperature.....-10° C
 Pressure altitude.....4,500 ft
 Forecast wind.....090° at 25 kts

Under these conditions, the magnetic heading and ground-speed would be approximately

- 1—003° and 166 knots.
- 2—323° and 177 knots.
- 3—332° and 166 knots.
- 4—340° and 177 knots.

3871. GIVEN:

True course.....238°
Variation.....3° W
Indicated airspeed.....160 kts
Ambient temperature.....-15° C
Pressure altitude.....8,500 ft
Forecast wind.....160° at 25 kts

Under these conditions, the magnetic heading and groundspeed would be approximately

- 1—224° and 171 knots.
- 2—233° and 171 knots.
- 3—241° and 178 knots.
- 4—249° and 171 knots.

3872. A true heading of 125° results in a ground track of 115°. With a true airspeed of 160 MPH and a groundspeed of 135 MPH, the wind is from

- 1—073° and 36 MPH.
- 2—145° and 29 MPH.
- 3—164° and 37 MPH.
- 4—175° and 36 MPH.

3873. If a true heading of 135° results in a ground track of 130° and a true airspeed of 135 knots results in a groundspeed of 140 knots, the wind would be from

- 1—019° and 12 knots.
- 2—166° and 14 knots.
- 3—200° and 13 knots.
- 4—246° and 13 knots.

3874. If a true heading of 350° results in a ground track of 335° and a true airspeed of 140 knots results in a groundspeed of 115 knots, the wind would be from

- 1—015° and 30 knots.
- 2—035° and 40 knots.
- 3—215° and 40 knots.
- 4—290° and 40 knots.

3875. If a true heading of 230° results in a ground track of 250° and a true airspeed of 160 knots results in a groundspeed of 175 knots, the wind would be from

- 1—135° and 59 knots.
- 2—165° and 60 knots.
- 3—270° and 37 knots.
- 4—343° and 60 knots.

3876. If you are 30 miles from the NDB transmitter and the ADF indicates 3° off course, how many miles off course are you?

- 1—6.
- 2—3.
- 3—1.5.
- 4—.3.

3877. Which statement is true regarding tracking a desired bearing when using ADF during crosswind conditions?

- 1—When on the desired track inbound with the proper drift correction established, the ADF pointer will be deflected to the windward side of the nose position.
- 2—When on the desired track outbound with the proper drift correction established, the ADF pointer will be deflected to the windward side of the tail position.
- 3—To track either inbound or outbound, heading corrections should be made away from the ADF pointer.
- 4—To track outbound, heading corrections should be made away from the ADF pointer.

3878. In reference to low frequency radiowave propagation the distance between the transmitting antenna and the point where the sky wave first returns to the ground is called the

- 1—skip zone.
- 2—ground wave.
- 3—skip distance.
- 4—ionosphere zone.

3879. NDB's normally operate in the frequency range of

- 1—400 to 1020 Hz.
- 2—108.0 to 117.95 MHz
- 3—962 to 1213 MHz.
- 4—190 to 535 kHz.

3880. The ADF is tuned to a nondirectional radio beacon and the relative bearing changes from 090° to 100° in 1.5 minutes' elapsed time. The time en route to the station would be

- 1—6 minutes.
- 2—9 minutes.
- 3—12 minutes.
- 4—15 minutes.

3881. The ADF indicates a 5° wingtip bearing change in 2.5 minutes' elapsed time. If the TAS is 125 knots, the distance to the station would be

- 1—26.0 NM.
- 2—31.2 NM.
- 3—56.5 NM.
- 4—62.5 NM.

3882. While maintaining a magnetic heading of 060° and a true airspeed of 130 knots, the 150 radial of a VOR is crossed at 1137 and the 140 radial at 1145. The approximate time and distance to the station would be

- 1—38 minutes and 82 NM.
- 2—42 minutes and 91 NM.
- 3—40 minutes and 96 NM.
- 4—48 minutes and 104 NM.

3883. While maintaining a magnetic heading of 180° and a true airspeed of 130 knots, the 270 radial of a VOR is crossed at 1037 and the 260 radial at 1042. The approximate time and distance to the station would be

- 1—30 minutes and 65 NM.
- 2—42 minutes and 91 NM.
- 3—44 minutes and 96 NM.
- 4—42 minutes and 104 NM.

3884. (Refer to figure 37.) If a magnetic heading of 050° is maintained and you are receiving ADF indication E, what will be the relative bearing to the station when you intercept the 180° magnetic bearing to the station?

- 1—180°.
- 2—130°.
- 3—310°.
- 4—230°.

3885. (Refer to figure 37.) If a magnetic heading of 170° is maintained and you are receiving ADF indication A, what will be the relative bearing to the station when you intercept the 090° magnetic bearing to the station?

- 1—280°.
- 2—090°.
- 3—260°.
- 4—270°.

3886. (Refer to figure 37.) If on a magnetic heading of 030° and receiving ADF indication E, to what heading should the aircraft be turned to intercept the 150° bearing from the station at a 30° angle?

- 1—270°.
- 2—210°.
- 3—180°.
- 4—120°.

3887. (Refer to figure 37.) If on a magnetic heading of 270° and receiving ADF indication B, to what heading should the aircraft be turned to intercept the 350° bearing from the station at a 20° angle?

- 1—330°.
- 2—290°.
- 3—010°.
- 4—190°.

3888. (Refer to figure 37.) If on a magnetic heading of 240° and receiving ADF indication B, what would be the magnetic bearing to the station?

- 1—360°.
- 2—180°.
- 3—240°.
- 4—060°.

3889. (Refer to figure 37.) If on a magnetic heading of 010° and receiving ADF indication F, what would be the magnetic bearing to the station?

- 1—360°.
- 2—190°.
- 3—180°.
- 4—010°.

3890. (Refer to figure 37.) If on a magnetic heading of 310° and receiving ADF indication C, what would be the magnetic bearing to the station?

- 1—135°.
- 2—315°.
- 3—085°.
- 4—265°.

3891. (Refer to figure 37.) If on a magnetic heading of 045°, which ADF indicator would show a magnetic bearing to the station of 090°?

- 1—A.
- 2—D.
- 3—E.
- 4—F.

3892. (Refer to figure 37.) If on a magnetic heading of 090°, which ADF indicator would show a magnetic bearing to the station of 180°?

- 1—A.
- 2—B.
- 3—D.
- 4—F.

3893. (Refer to figure 37.) If on a magnetic heading of 120°, which ADF indicator would show a magnetic bearing to the station of 210°?

- 1—A.
- 2—C.
- 3—D.
- 4—E.

3894. (Refer to figure 37.) If on a magnetic heading of 060°, which ADF indicator shows you to be southwest of the station?

- 1—B.
- 2—C.
- 3—D.
- 4—F.

3895. What is the relationship of VHF radio reception and altitude?

- 1—VHF reception distance varies in proportion to the altitude of the receiving equipment.
- 2—Unlike reception with L/MF (low or medium frequency) equipment, VHF reception is not subject to line-of-sight restrictions.
- 3—VHF reception distance remains constant regardless of altitude.
- 4—Reception of VHF signals is more subject to signal fades and interference from distant stations than reception of L/MF (low or medium frequency) signals.

3896. The normal usable range of an L class VOR below 18,000 feet is

- 1—25 NM.
- 2—40 NM.
- 3—100 NM.
- 4—130 NM.

3897. The normal usable range of a T class VOR below 12,000 feet is

- 1—25 NM.
- 2—40 NM.
- 3—100 NM.
- 4—130 NM.

3898. The normal usable range of an H class VOR from 18,000 feet to FL450 is

- 1—25 NM.
- 2—40 NM.
- 3—100 NM.
- 4—130 NM.

3899. The normal usable range of an H class VOR above FL450 is

- 1—25 NM.
- 2—40 NM.
- 3—100 NM.
- 4—130 NM.

3900. When using a VOT to check the accuracy of a VOR receiver with an RMI, what should the RMI indicate if no error exists?

- 1—180° FROM.
- 2—360° TO.
- 3—180° TO.
- 4—360° FROM.

3901. When using a VOT to check the accuracy of a VOR receiver, with the CDI centered, what should the OBS indicate if no error exists?

- 1—180° FROM, 360° TO.
- 2—180° TO, 360° FROM.
- 3—360° TO, 270° FROM.
- 4—090° TO, 270° FROM.

3902. A particular VORTAC station is undergoing routine maintenance. This is evidenced by

- 1—removal of the voice feature of the TACAN.
- 2—broadcasting a maintenance alert notice on the voice channel.
- 3—removal of the identification feature.
- 4—transmitting a series of dashes after each identification signal.

3903. The very high frequency radio band is from

- 1—30 to 300 MHz.
- 2—3000 kHz to 30 MHz.
- 3—300 to 3000 kHz.
- 4—30 to 300 kHz.

3904. The three individual navigation services provided by a VORTAC facility are

- 1—VHF VOR azimuth, UHF TACAN azimuth, and UHF TACAN distance information.
- 2—UHF VOR azimuth, UHF TACAN azimuth, and UHF TACAN distance information.
- 3—VHF VOR azimuth, VHF TACAN azimuth, and VHF TACAN distance information.
- 4—UHF VOR azimuth, VHF TACAN azimuth, and UHF TACAN distance information.

3905. Which distance is commonly displayed by the DME indicator?

- 1—Slant-range distance in nautical miles.
- 2—Slant-range distance in statute miles.
- 3—The distance from the aircraft to a point at the altitude directly above the VORTAC.
- 4—Line-of-sight direct distance from aircraft to VORTAC in statute miles.

3906. Which DME indication should you receive when you are directly over a VORTAC site at approximately 6,000 feet AGL?

- 1—0.
- 2—1.
- 3—1.3.
- 4—6.

3907. Which statement is true concerning the operation of DME?

- 1—Aircraft must have TACAN equipment to obtain distance information from a VORTAC.
- 2—DME operates in the VHF frequency band.
- 3—Distance information received from DME is the horizontal distance from the station.
- 4—DME coded identification is transmitted once for every three or four times that the VOR coded identification is transmitted.

3908. The slant-range error of the DME is greatest

- 1—low altitude directly over the facility.
- 2—low altitude and high range from the facility.
- 3—high altitude directly over the facility.
- 4—high altitude and high range from the facility.

3909. Up to 199 NM at line-of-sight altitudes, the accuracy of DME systems is better than

- 1—1 mile or 6 percent of the distance, whichever is greater.
- 2—1/2 mile or 3 percent of the distance, whichever is greater.
- 3—1 mile or 3 percent of the distance, whichever is greater.
- 4—1/2 mile or 6 percent of the distance, whichever is greater.

3910. In an RNAV mode, the lateral deflection of the CDI indicates

- 1—degrees left or right of course.
- 2—nautical miles left or right of course.
- 3—statute miles left or right of course.
- 4—thousands of feet left or right of course.

3911. (Refer to figure 38.) At which aircraft position(s) would you receive OMNI indication V?

- 1—F only.
- 2—E, H, and C.
- 3—E and H.
- 4—B only.

3912. (Refer to figure 38.) At which aircraft position(s) would you receive OMNI indication X?

- 1—A and C.
- 2—A and G.
- 3—C and G.
- 4—G only.

3913. (Refer to figure 38.) At which aircraft position(s) would you receive OMNI indication U?

- 1—A and B.
- 2—A, B, and F.
- 3—B only.
- 4—F only.

3914. (Refer to figure 38.) Which OMNI indication would you receive for aircraft H?

- 1—T.
- 2—U.
- 3—V.
- 4—W.

3915. (Refer to figure 38.) Which OMNI indications would you receive for aircraft E and G?

- 1—T and X.
- 2—W and Z.
- 3—V and T.
- 4—V and X.

3916. (Refer to figure 39.) Which RMI indicator shows your position to be northwest of the station?

- 1—B.
- 2—C.
- 3—I.
- 4—J.

3917. (Refer to figure 39.) Which RMI indicator shows you crossing the 115 radial?

- 1—B.
- 2—E.
- 3—G.
- 4—H.

3918. (Refer to figure 39.) RMI indicator B shows the magnetic bearing to the station to be

- 1—115°.
- 2—125°.
- 3—295°.
- 4—305°.

3919. (Refer to figure 39.) Which RMI indicator shows you outbound on the 315 radial?

- 1—A.
- 2—C.
- 3—D.
- 4—I.

3920. (Refer to figure 40.) What radial does HSI indicator A show you to be crossing?

- 1—040.
- 2—180.
- 3—220.
- 4—360.

3921. (Refer to figure 40.) Select the true statement regarding HSI indicator E.

- 1—The aircraft is inbound on the 240 radial.
- 2—The aircraft heading is 360°.
- 3—The aircraft will intercept the selected course at a 15° angle.
- 4—The aircraft is on a heading of 345°.

3922. (Refer to figure 40.) Which HSI indicator shows a 210° magnetic bearing to the station?

- 1—A.
- 2—B.
- 3—C.
- 4—D.

3923. (Refer to figure 40.) Which HSI indicator shows the heading marker to be on 345°?

- 1—C.
- 2—D.
- 3—E.
- 4—F.

3924. (Refer to figure 40.) Which HSI indicator shows the aircraft intercepting the 360 radial with a 40° intercept angle?

- 1—A.
- 2—B.
- 3—D.
- 4—F.

3925. (Refer to figure 41.) What is the elevation of the top of the double obstruction 4 statute miles north of Pleasanton Airport (area A)?

- 1—425 feet MSL.
- 2—428 feet MSL.
- 3—447 feet MSL.
- 4—850 feet MSL.

3926. (Refer to figure 41.) On what frequency is Automatic Terminal Information Service transmitted at San Antonio International Airport (area D)?

- 1—118.9.
- 2—119.8.
- 3—122.8.
- 4—122.95.

3927. (Refer to figure 41.) Select the correct statement concerning the obstruction 17 statute miles north of Pleasanton Airport (area A).

- 1—The obstruction is unlighted.
- 2—The obstruction has high-intensity lights.
- 3—The elevation of the top of the obstruction is 1,639 feet above ground level.
- 4—The obstruction is a designated visual check point.

3928. (Refer to figure 41.) What is the elevation of Castroville Airport (area C)?

- 1—1,300 feet MSL.
- 2—772 feet MSL.
- 3—500 feet MSL.
- 4—50 feet MSL.

3929. (Refer to figure 41.) What is the length of the longest runway at Zuehl Airport (area E)?

- 1—8,300 feet.
- 2—5,920 feet.
- 3—3,000 feet.
- 4—2,200 feet.

3930. (Refer to figure 41.) Select the correct statement concerning the San Antonio VORTAC (area D).

- 1—The VORTAC frequency has no voice capability.
- 2—The VORTAC frequency is 122.2.
- 3—A pilot may receive transmissions from San Angelo Flight Service over the VORTAC frequency.
- 4—The VORTAC has been decommissioned.

3931. (Refer to figure 41.) When are two-way radio communications required during a flight from Castroville Airport (area C) to Zuehl Airport (area E) at 3,500 feet MSL?

- 1—When entering the Kelly, Stinson, and Randolph Airport Traffic Areas, as well as entering the San Antonio Airport Radar Service Area.
- 2—When entering the Kelly and Stinson Airport Traffic Areas, the San Antonio Airport Radar Service Area, and Randolph restricted area.
- 3—When entering the San Antonio Airport Radar Service Area.
- 4—When entering the Kelly, Stinson, and Randolph Control Zones.

3932. (Refer to figure 41.) Where does the floor of controlled airspace begin over Boeing Airport (area G)?

- 1—1,200 feet MSL.
- 2—1,200 feet AGL.
- 3—700 feet MSL.
- 4—700 feet AGL.

3933. (Refer to figure 41.) Where does the floor of controlled airspace begin over Devine Airport (area B)?

- 1—Surface.
- 2—700 feet MSL.
- 3—1,402 feet MSL.
- 4—1,800 feet MSL.

3934. (Refer to figure 41.) What is the ceiling of the San Antonio Airport Radar Service Area (area D)?

- 1—3,000 feet MSL.
- 2—3,000 feet AGL.
- 3—4,800 feet MSL.
- 4—4,800 feet AGL.

3935. (Refer to figure 41.) The airspace over Kelly AFB Airport (area F) which begins at the surface and terminates at 14,500 feet is

- 1—a control zone.
- 2—an Airport Traffic Area.
- 3—an Airport Radar Service Area.
- 4—a Terminal Control Area.

3936. (Refer to figure 41.) As it relates to operations in the Airport Radar Service Area, which statement is correct when departing Twin Oaks Airport (area D)?

- 1—Prior permission from approach control must be obtained before entering the area.
- 2—Two-way radio communication with air traffic control must be established as soon as possible after departure.
- 3—If the pilot intends to climb to an altitude above 4,800 feet MSL, no radio communications are required.
- 4—An altitude below 2,000 feet MSL must be maintained until clear of the area.

3937. (Refer to figure 41.) What are the requirements for operating in the alert area surrounding Randolph AFB (area E)?

- 1—Prior permission must be obtained from the controlling agency.
- 2—There are no requirements, but pilots should be extremely vigilant due to the extensive student training.
- 3—An altitude below 3,000 feet MSL should be maintained until clear of the area.
- 4—Contact with approach control on frequency 118.9 is required.

3938. (Refer to figure 42.) The minimum radio equipment to operate in the airspace below 7,000 feet MSL and above 1,000 feet AGL over Los Angeles International Airport (area A) is

- 1—two-way radio communications equipment, transponder, and encoding altimeter.
- 2—two-way radio communications equipment and transponder.
- 3—transponder and encoding altimeter.
- 4—encoding altimeter and DME receiver.

3939. (Refer to figure 42.) The airspace overlying Fullerton Airport (area C) is

- 1—uncontrolled from the surface to 700 feet AGL.
- 2—a Terminal Control Area from the surface to 7,000 feet MSL.
- 3—a control zone from the surface to 14,500 feet MSL.
- 4—an Airport Traffic Area from the surface to 3,000 feet MSL.

3940. (Refer to figure 42.) What minimum radio equipment is required for operation into Ontario International Airport (area F)?

- 1—Two-way radio communications equipment, transponder, and DME.
- 2—Two-way radio communications equipment and transponder.
- 3—transponder and DME.
- 4—Two-way radio communications equipment.

3941. (Refer to figure 42.) The top of the ARSA at Ontario International Airport (area F) is

- 1—1,200 feet AGL.
- 2—3,000 feet AGL.
- 3—3,000 feet above the airport.
- 4—4,000 feet above the airport.

3942. (Refer to figure 42.) The base of the outer circle of the ARSA at Ontario International Airport (area F) is

- 1—500 feet AGL.
- 2—700 feet AGL.
- 3—1,000 feet AGL.
- 4—1,200 feet AGL.

3943. (Refer to figure 42.) The airspace overlying Van Nuys Airport (area E) from 3,000 feet MSL to 4,800 feet MSL is

- 1—a TCA.
- 2—an ARSA.
- 3—a TRSA.
- 4—an Airport Traffic Area.

3944. (Refer to figure 42.) At what altitude does the TCA begin over Compton Airport (area B)?

- 1—Surface.
- 2—3,000 feet AGL.
- 3—5,000 feet MSL.
- 4—7,000 feet MSL.

3945. (Refer to figure 42.) When are two-way radio communications required if you are en route from Compton Airport (area B) to Cable Airport (area G)?

- 1—When operating in the TCA only.
- 2—When in the TCA and the Ontario ARSA.
- 3—When flying through the Brackett Airport Traffic Area.
- 4—When operating in the TCA, the Ontario ARSA, and flying through the Brackett Airport Traffic Area.

3946. (Refer to figure 42.) What is the floor of the TCA over Shepard Airport (area D)?

- 1—7,500 feet MSL.
- 2—7,000 feet MSL.
- 3—2,500 feet MSL.
- 4—2,000 feet MSL.

3947. (Refer to figure 43.) What does the figure 1⁷ in the northeast section of the chart indicate?

- 1—The minimum safe altitude for that quadrangle.
- 2—The height of the tallest obstruction for that quadrangle.
- 3—The maximum terrain elevation figure for that quadrangle.
- 4—The minimum safe altitude for operating on the airway (V66) in that quadrangle.

3948. (Refer to figure 43.) Where does the floor of controlled airspace begin over Dallas North Airport (point E)?

- 1—Surface.
- 2—700 feet AGL.
- 3—1,200 feet AGL.
- 4—5,000 feet MSL.

3949. (Refer to figure 43.) The airspace beginning at 3,000 feet MSL over Addison Airport (point D) is

- 1—an Airport Radar Service Area.
- 2—an Airport Traffic Area.
- 3—a Terminal Control Area.
- 4—a Terminal Radar Service Area.

3950. (Refer to figure 43.) What altitude should be selected to avoid operating in a Terminal Control Area on a flight which departs Saginaw Airport (area A) and lands at Aero Valley Hyde-Way Airport (point B)?

- 1—9,500 feet MSL.
- 2—3,500 feet MSL.
- 3—3,000 feet MSL.
- 4—2,500 feet MSL.

3951. (Refer to figure 43.) What is the ceiling of Airport Radar Service Area over Addison Airport (point D)?

- 1—8,000 feet MSL.
- 2—5,000 feet MSL.
- 3—4,500 feet MSL.
- 4—3,000 feet AGL.

3952. (Refer to figure 43.) When, if ever, are two-way radio communications required if en route from Lancaster Airport (point C) direct to Dallas North Airport at 3,000 feet MSL?

- 1—When entering the Airport Radar Service Area.
- 2—When entering the Terminal Radar Service Area.
- 3—When transitioning through Dallas Love and Addison Airport Traffic Areas.
- 4—When entering the Terminal Control Area.

3953. The visual glide slope of a 2-bar VASI provides safe obstruction clearance within plus or minus 10° of the extended runway centerline and to a distance of how many miles from the runway threshold?

- 1—4 NM.
- 2—6 NM.
- 3—8 NM.
- 4—10 NM.

3954. Which indications would a pilot see while approaching to land on a runway served by a 2-bar VASI?

- 1—If below the glide slope, the near bars will be red and the far bars white.
- 2—If on the glide slope, the near bars will appear red and the far bars will appear white.
- 3—If departing to the high side of the glide slope, the far bars will change from red to pink to white.
- 4—If on the glidepath, both near bars and far bars will appear white.

3955. When on the glide slope of a standard 2-bar VASI, the far lights should be

- 1—red and the near lights should be white.
- 2—pink and the near lights should be white.
- 3—pink and the near lights should be pink.
- 4—white and the near lights should be red.

3956. When on the upper glidepath of a 3-bar VASI what would be the colors of the lights?

- 1—All three sets of lights would be white.
- 2—All three sets of lights would be red.
- 3—The near bar is white and the middle and far bars are red.
- 4—The near and middle bars are white and the upper bar is red.

3957. An on-glide slope indication from a tri-color VASI is

- 1—a white light signal.
- 2—a green light signal.
- 3—an amber light signal.
- 4—a pink light signal.

3958. An above glide slope indication from a tri-color VASI is

- 1—a white light signal.
- 2—a green light signal.
- 3—an amber light signal.
- 4—a pink light signal.

3959. A slightly low indication on a PAPI glidepath is indicated by

- 1—one red light and three white lights.
- 2—two red lights and two white lights.
- 3—one white light and three red lights.
- 4—four red lights.

3960. The last 2,000 feet of runway edge lights on an instrument runway are colored

- 1—amber.
- 2—white.
- 3—red.
- 4—green.

3961. A series of continuous red lights in the runway centerline lighting indicates that

- 1—1,000 feet of runway remain.
- 2—3,000 feet of runway remain.
- 3—one-half of the runway remains.
- 4—there are no taxiway turnoffs until the end of the runway.

3962. An airport has pilot controlled lighting but runways without approach lights. How many times should you key your microphone to turn on the MIRL at medium intensity?

- 1—7 clicks.
- 2—5 clicks.
- 3—3 clicks.
- 4—None, the MIRL is left on all night.

3963. A military airfield can be identified by

- 1—a flashing red light.
- 2—a white and red rotating beacon.
- 3—white flashing sequence lights (strobes).
- 4—a green and dual-peaked white rotating beacon.

3964. An unlighted land airport is indicated by a rotating beacon that is colored

- 1—white.
- 2—green.
- 3—yellow.
- 4—white and green.

3965. During the daylight hours, the operation of a rotating beacon at an airport located within a control zone means

- 1—right-hand traffic is in use at the airport.
- 2—the control tower is not in operation.
- 3—weather conditions are below basic VFR weather minimums.
- 4—parachute jumping is in progress in the Airport Traffic Area.

3966. The numbers 8 and 26 on the approach ends of the runway indicate that the runway is orientated approximately

- 1—080° and 260° magnetic.
- 2—008° and 026° true.
- 3—080° and 260° true.
- 4—008° and 026° magnetic.

3967. What does a series of arrows painted on the approach end of a runway signify?

- 1—That area is restricted solely to taxi operations.
- 2—That portion of the runway is not suitable for landing.
- 3—All landings and takeoffs on that runway must be made in the direction of the arrows.
- 4—That portion of the runway is the designated touchdown zone.

3968. If a landing were to be made on Rwy 12 shown in figure 44, which statement would be true concerning runway markings?

- 1—Area "E" contains an arresting device used by military aircraft.
- 2—All aircraft must terminate their landing roll prior to reaching the intersection of Rwy 12-30 and Rwy 17R-35L.
- 3—Point "B" is the displaced threshold of Rwy 12 and indicates the beginning portion of the runway usable for landing.
- 4—Area "A" should be used for landings in small airplanes only.

3969. What is the difference between area "A" and area "E" on the airport depicted in figure 44?

- 1—"A" may be used for taxi and takeoff; "E" may only be used as an overrun.
- 2—"A" may be used for all operations except heavy aircraft landings; "E" may only be used as an overrun.
- 3—"A" may only be used for taxi; "E" may be used for all operations except landings.
- 4—Both "A" and "E" may be used for taxi and takeoff.

3970. When approaching taxiway holding lines from the side with the continuous lines the pilot

- 1—may continue taxiing.
- 2—should continue taxiing until all parts of the aircraft have crossed the lines.
- 3—need not be concerned unless Category I approaches are in effect.
- 4—should not cross the lines without ATC clearance.

3971. The UNICOM frequency at airports with a control tower is

- 1—123.0
- 2—122.95.
- 3—122.975.
- 4—122.8.

3972. As standard operating practice, all inbound traffic to an airport without a control tower should continuously monitor the appropriate facility from a distance of

- 1—10 miles.
- 2—20 miles.
- 3—25 miles.
- 4—30 miles.

3973. When landing at an airport that does not have a tower, FSS, or UNICOM, you should broadcast your intentions on

- 1—123.0 MHz.
- 2—123.6 MHz.
- 3—121.5 MHz.
- 4—122.9 MHz.

3974. Absence of the sky condition and visibility on an ATIS broadcast indicates that

- 1—the ceiling is at least 5,000 feet and visibility is 5 miles or more.
- 2—the sky condition is clear and visibility is unrestricted.
- 3—weather conditions are at or above VFR minimums.
- 4—the ceiling is at least 3,000 feet and visibility is 7 miles or more.

3975. When are ATIS broadcasts updated?

- 1—Every 30 minutes if weather conditions are below basic VFR; otherwise, hourly.
- 2—Upon receipt of any official weather, regardless of content change or reported values.
- 3—Only when conditions change enough to require a change in the active runway or instrument approach in use.
- 4—Only when the ceiling and/or visibility changes by a reportable value.

3976. While flying on an east heading, a radar ATC facility issues the following warning:

"TRAFFIC 3 O'CLOCK, 2 MILES, WESTBOUND...."

You should look for this traffic in the direction of your aircraft's

- 1—left wingtip, and ahead of you.
- 2—left wingtip.
- 3—right wingtip.
- 4—nose and slightly to the right.

3977. While flying in a TCA, you receive the following radar traffic advisory:

"TRAFFIC 11 O'CLOCK, 1 MILE, EASTBOUND...."

You should look for this traffic.

- 1—off your right wingtip.
- 2—between the nose of the aircraft and the right wingtip.
- 3—behind the left wingtip.
- 4—between the nose of the aircraft and the left wingtip.

3978. When an air traffic controller issues radar traffic information in relation to the 12-hour clock, the reference the controller uses is the aircraft's

- 1—ground track.
- 2—magnetic heading.
- 3—true course.
- 4—compass heading.

3979. Which transponder code should a civil pilot never use?

- 1—0001.
- 2—3333.
- 3—7500.
- 4—7777.

3980. Which action is appropriate if a pilot becomes involved in a hijacking?

- 1—Transmit and receive on the special emergency (air piracy) frequency, 128.5.
- 2—Append the code word PAPA to the aircraft call sign during all radio transmissions.
- 3—Transmit code H on 121.5.
- 4—Set code 7500 on the aircraft transponder.

3981. If the aircraft's radio fails, what is the recommended procedure when landing at a controlled airport?

- 1—Observe the traffic flow, enter the pattern, and look for a light signal from the tower.
- 2—Enter a crosswind leg and rock your wings.
- 3—Flash your landing lights and cycle your landing gear while circling the airport.
- 4—Select 7700 on your transponder and fly a normal traffic pattern, and land.

3982. The recommended entry position to an airport traffic pattern is

- 1—straight-in on final slightly above traffic pattern altitude.
- 2—45° to the base leg just below traffic pattern altitude.
- 3—to cross directly over the airport at traffic pattern altitude and join the downwind leg.
- 4—to enter 45° at the midpoint of the downwind leg at traffic pattern altitude.

3983. The segmented circle shown in figure 45 indicates that the airport traffic pattern is

- 1—left-hand for Rwy 17 and right-hand for Rwy 35.
- 2—right-hand for Rwy 9 and left-hand for Rwy 27.
- 3—right-hand for Rwy 35 and right-hand for Rwy 9.
- 4—left-hand for Rwy 35 and right-hand for Rwy 17.

3984. Which runway and traffic pattern should be used as indicated by the wind cone in the segmented circle depicted in figure 45?

- 1—Right-hand traffic on Rwy 35.
- 2—Right-hand traffic on Rwy 17.
- 3—Left-hand traffic on Rwy 35 or right-hand traffic on Rwy 27.
- 4—Left-hand traffic on Rwy 27 or Rwy 35.

3985. If the control tower wants to instruct a vehicle to proceed, the light gun signal will be

- 1—flashing green.
- 2—steady green.
- 3—flashing white.
- 4—alternating red and green.

3986. To acknowledge light gun signals from the tower at night, the pilot should

- 1—move the control surfaces.
- 2—S-turn on the ground or roll back and forth in the air.
- 3—fly over the tower or taxi in a circle.
- 4—blink landing or navigation lights.

3987. Pilots are encouraged to turn on their landing lights when operating below 10,000 feet, day or night, and when operating within

- 1—a Terminal Control Area.
- 2—5 miles of a controlled airport.
- 3—10 miles of any airport.
- 4—controlled airspace within 1,200 feet of the surface.

3988. Pilots are encouraged to turn on the aircraft rotating beacon

- 1—just prior to takeoff.
- 2—just prior to taxi.
- 3—any time the engines are in operation.
- 4—only when the visibility is less than 5 miles.

3989. When information is disseminated for a navigational facility it will be located in

- 1—FDC NOTAMS.
- 2—NOTAM (D) distribution.
- 3—NOTAM (L) distribution.
- 4—Service B telecommunications.

3990. When information is disseminated about a runway closure it will be located in

- 1—FDC NOTAMS.
- 2—NOTAM (D) distribution.
- 3—NOTAM (L) distribution.
- 4—Service A telecommunications.

3991. How long will an FSS hold a VFR flight plan past the proposed departure time?

- 1—30 minutes.
- 2—1 hour.
- 3—2 hours.
- 4—No time limit.

3992. If an aircraft has a transponder, encoding altimeter, and DME, the proper equipment suffix to be entered on a flight plan is

- 1—U.
- 2—A.
- 3—P.
- 4—R.

3993. How much time do you have to close a VFR flight plan before Search and Rescue procedures are initiated?

- 1—One-half hour after your ETA.
- 2—One-half hour after landing.
- 3—One hour after your ATA.
- 4—There is no time limit at an airport with a control tower.

3994. Hazardous vortex turbulence that might be encountered behind large aircraft is created only when that aircraft is

- 1—developing lift.
- 2—heavily loaded.
- 3—operating at high airspeeds.
- 4—using high-power settings.

3995. Wingtip vortices which trail behind airplanes in flight are caused by the

- 1—pressure differential existing between the upper and lower surfaces of the wings.
- 2—axial flow or jetwash from turbine-driven airplanes.
- 3—propwash, or jetwash, depending on the type and speed of the airplane.
- 4—slipstream or propwash of propeller-driven airplanes.

3996. How does the wake turbulence vortex circulate around each wingtip?

- 1—Inward, upward, and around each tip.
- 2—Clockwise as viewed from behind.
- 3—Inward, upward, and counterclockwise.
- 4—Outward, upward, and around each tip.

3997. Wingtip vortices created by large aircraft tend to

- 1—sink below the aircraft generating the turbulence.
- 2—rise into the traffic pattern.
- 3—rise into the takeoff or landing path of a crossing runway.
- 4—accumulate at the beginning of the takeoff roll.

3998. What effect would a crosswind of 5 knots or less have on the wingtip vortices generated by a large aircraft that had just taken off?

- 1—The upwind vortex would tend to remain on the runway longer than the downwind vortex.
- 2—A light crosswind would rapidly dissipate the strength of both vortices.
- 3—The downwind vortex would tend to remain on the runway longer than the upwind vortex.
- 4—Both vortices would move downwind at a greater rate than if the surface wind was directly down the landing runway.

3999. During a takeoff made behind a departing large jet airplane, the pilot can minimize the hazard of wingtip vortices by

- 1—being airborne prior to reaching the jet's flightpath until able to turn clear of its wake.
- 2—remaining below the jet's flightpath until able to turn clear of its wake.
- 3—maintaining extra speed on takeoff and climbout.
- 4—extending the takeoff roll and not rotating until well beyond the jet's rotation point.

4000. When landing behind a large jet aircraft, at which point on the runway should you plan to land?

- 1—If any crosswind, land on the downwind side of the runway and prior to the jet's touchdown point.
- 2—If any crosswind, land on the windward side of the runway and prior to the jet's touchdown point.
- 3—At least 1,000 feet beyond the jet's touchdown point.
- 4—Beyond the jet's touchdown point.

4001. Information concerning parachute jumping sites may be found in the

- 1—Graphic Notices and Supplemental Data.
- 2—legend of Sectional Aeronautical Charts only.
- 3—Airport/Facility Directory.
- 4—NOTAM's.

4002. (Refer to figure 46.) The longest runway at Tyler Pounds Field is runway

- 1—13 — 31.
- 2—04 — 22.
- 3—17 — 35.
- 4—35.

4003. (Refer to figure 46.) What is the UNICOM frequency for Tyler Pounds Field?

- 1—120.1.
- 2—122.3.
- 3—122.95.
- 4—126.25.

4004. (Refer to figure 46.) On what frequency can a pilot activate the approach lights at Tyler Pounds Field when the control tower is not in operation?

- 1—120.1.
- 2—121.9.
- 3—122.95.
- 4—126.25.

4005. (Refer to figure 46.) Select the correct statement concerning Tyler Pounds Field.

- 1—The runway threshold for Rwy 35 is displaced 216 feet.
- 2—There is a low-level wind shear alerting system located on the airport.
- 3—Rwy 13 is permanently closed.
- 4—Rwy 22 has a visual approach slope indicator.

4006. Which statement is true regarding alcohol in the human system?

- 1—Aspirin increases the rate the body metabolizes alcohol.
- 2—Small amounts of alcohol in the human system increase judgment and decision-making abilities.
- 3—An increase in altitude decreases the adverse effect/influence of alcohol.
- 4—A common misconception is that coffee alters the rate the body metabolizes alcohol.

4007. Hypoxia is the result of which of these conditions?

- 1—Insufficient oxygen reaching the brain.
- 2—Excessive carbon dioxide in the bloodstream.
- 3—Excessive oxygen in the bloodstream.
- 4—Insufficient carbon dioxide in the bloodstream.

4008. Which statement concerning hypoxia is true?

- 1—It is possible to predict exactly when and at what flight level hypoxia will occur, and how it will manifest itself.
- 2—Tingling of the skin and a false sense of security may be symptoms of hypoxia.
- 3—Hypoxia is caused by nitrogen bubbles in the joints and bloodstream.
- 4—Forcing oneself to concentrate on the flight instruments will help to overcome the effects of hypoxia.

4009. If an individual has gone scuba diving which has not required a controlled ascent and will be flying up to cabin pressure altitudes of 8,000 feet or less, that individual should wait, at least

- 1—2 hours.
- 2—4 hours.
- 3—8 hours.
- 4—12 hours.

4010. If an individual has gone scuba diving in which a controlled ascent was required and is going to fly at cabin pressure altitudes up to 8,000 feet, that individual should wait at least

- 1—4 hours.
- 2—8 hours.
- 3—12 hours.
- 4—24 hours.

4011. After any scuba diving and then flight to cabin pressure altitudes above 8,000 feet is planned, an individual should wait at least

- 1—8 hours.
- 2—12 hours.
- 3—18 hours.
- 4—24 hours.

4012. Which would most likely result in hyperventilation?

- 1—Insufficient carbon dioxide.
- 2—Excessive carbon monoxide.
- 3—Insufficient oxygen.
- 4—Excessive carbon dioxide.

4013. Rapid or extra deep breathing while using oxygen can cause a condition known as

- 1—hypoxia.
- 2—aerosinusitis.
- 3—erotitis.
- 4—hyperventilation.

4014. A pilot should be able to overcome the symptoms or avoid future occurrences of hyperventilation by

- 1—closely monitoring the flight instruments to control the airplane.
- 2—slowing the breathing rate, breathing into a bag, or talking aloud.
- 3—increasing the breathing rate in order to increase lung ventilation.
- 4—refraining from the use of over-the-counter remedies and drugs such as antihistamines, cold tablets, tranquilizers, etc.

4015. Which procedure is recommended to prevent or overcome spatial disorientation?

- 1—Reduce head and eye movements to the greatest extent possible.
- 2—Rely on the kinesthetic sense.
- 3—Avoid steep turns and rough control movements.
- 4—Rely entirely on the indications of the flight instruments.

4016. When the hairs in the semicircular canals of the inner ear are deflected, the pilot may experience

- 1—discomfort or pain on the ear drum.
- 2—spatial disorientation.
- 3—hyperventilation.
- 4—hypoxia.

4017. Which occurs when climbing above 28,000 feet in an unpressurized airplane without supplemental oxygen?

- 1—The oxygen pressure within the lungs cannot be maintained without an increase in inhaled oxygen pressure.
- 2—The pressure in the middle ear becomes less than the atmospheric pressure in the cabin.
- 3—Vision improves significantly as altitude increases because carbon dioxide is released from the body.
- 4—Gases trapped in the body contract and prevent nitrogen from escaping the bloodstream.

4018. A rapid acceleration can create the illusion of being in a

- 1—left turn.
- 2—right turn.
- 3—noseup attitude.
- 4—nosedown attitude.

4019. An illusion that the aircraft is at a higher altitude than it actually is, is produced by

- 1—upsloping terrain.
- 2—downsloping terrain.
- 3—atmospheric haze.
- 4—a wider-than-usual runway.

4020. Dark adaptation is impaired by exposure to

- 1—vitamin A in the diet.
- 2—carbon dioxide.
- 3—oxygen.
- 4—cabin pressure altitudes above 5,000 feet.

4021. What suggestion could you make to students who are experiencing motion sickness?

- 1—Recommend taking medication to prevent motion sickness.
- 2—Tell the students to avoid unnecessary head movement and to keep their eyes on a point outside the aircraft.
- 3—Have the students lower their head, shut their eyes, and take deep breaths.
- 4—Suggest that the flight be continued because this will help build up resistance.

4022. Motion sickness is caused by

- 1—a chemical imbalance in the body.
- 2—continued stimulation of the tiny portion of the inner ear which controls sense of balance.
- 3—an instability in the brain cells which affects balance and will generally be overcome with experience.
- 4—the movement of an aircraft causing the stomach to create an acid substance which causes the stomach lining to contract.

4023. Which technique should a student be taught to scan for traffic to the right and left during straight-and-level flight?

- 1—Systematically focus on different segments of the sky for short intervals.
- 2—Concentrate on relative movement detected in the peripheral vision area.
- 3—Continuous sweeping of the windshield from right to left.
- 4—Concentrate on traffic ahead and to the right because traffic to the left must give right of way.

4024. What effect does haze have on the ability to see traffic or terrain features during flight?

- 1—Haze causes the eyes to focus at infinity.
- 2—The eyes tend to overwork in haze and do not detect relative movement easily.
- 3—Contrasting colors become more distinct making objects more difficult to see.
- 4—All traffic or terrain features appear to be farther away than their actual distance.

4025. What is an effective way to prevent a collision hazard in the traffic pattern?

- 1—Enter the pattern in a descent.
- 2—Maintain the proper traffic pattern altitude and continually scan the area.
- 3—Rely on radio reports from other aircraft who may be operating in the traffic pattern.
- 4—Execute S-turns during the entire traffic pattern to assist in scanning.

4026. The most effective technique to use for detecting other aircraft at night is to

- 1—turn the head and sweep the eyes rapidly over the entire visible region.
- 2—avoid staring directly at the point where another aircraft is suspected to be flying.
- 3—avoid scanning the region below the horizon so as to avoid the effect of ground lights on the eyes.
- 4—stare directly at the point where another aircraft is suspected to be flying.

4027. Most midair collision accidents occur during

- 1—instrument meteorological conditions.
- 2—hazy days.
- 3—cloudy nights.
- 4—clear days.

4028. One aid in increasing night vision effectiveness would be to

- 1—avoid concentrating on trying to see objects.
- 2—move the eyes more rapidly than in daylight.
- 3—look directly at objects.
- 4—force the eyes to view off center.

4029. To help prevent overturning when taxiing light tricycle-gear airplanes (especially the high-wing type) in strong quartering tailwinds, the

- 1—aileron on the downwind side should be placed in the down position.
- 2—elevator should be placed in the up position.
- 3—aileron on the upwind side should be placed in the up position.
- 4—elevator should be placed in the down position.

4030. Which of the following aileron positions should you generally use when taxiing in strong quartering headwinds?

- 1—Aileron up on the side from which the wind is blowing.
- 2—Aileron down on the side from which the wind is blowing.
- 3—Neutral.
- 4—Aileron parallel to the ground on the side from which the wind is blowing.

4031. When taxiing with strong quartering tailwinds, which of the following aileron positions should be used?

- 1—Aileron parallel to the ground on the side from which the wind is blowing.
- 2—Neutral (streamlined position).
- 3—Aileron up on the side from which the wind is blowing.
- 4—Aileron down on the side from which the wind is blowing.

4032. Why should an airplane be headed into the wind for the pretakeoff check?

- 1—To obtain more accurate operating indications and to minimize engine overheating when the engine is run up.
- 2—To prevent excessive load factors which could occur during runup if a crosswind condition exists.
- 3—To prevent the need for more brake pressure to keep the airplane from moving forward.
- 4—To reduce the risk of debris being picked up by the propeller.

4033. Name the four flight fundamentals involved in maneuvering an aircraft?

- 1—Aircraft power, pitch, bank, and trim.
- 2—Straight-and-level flight, turns, climbs, and descents.
- 3—Takeoffs, slow flight, fast flight, and stalls.
- 4—Starting, taxiing, takeoff, and landing.

4034. When explaining the techniques used for making short- and soft-field takeoffs, it would be correct to state that

- 1—the same technique should be used for both.
- 2—during soft-field takeoffs, lift-off should be made as soon as possible.
- 3—during short-field takeoffs, lift-off should be attempted only after best rate-of-climb speed is attained.
- 4—during soft-field takeoffs, lift-off should be made only when best angle-of-climb speed is attained.

4035. The indicated lift-off airspeed for short-field takeoffs in a particular airplane will normally be

- 1—lower than for soft- or rough-field takeoffs.
- 2—the same as for soft- or rough-field takeoffs.
- 3—greater than for soft- or rough-field takeoffs.
- 4—greater under tailwind conditions than that required under headwind conditions.

4036. Which would likely result in a slipping turn?

- 1—Increasing the rate of turn without increasing bank.
- 2—Holding bottom rudder in a turn.
- 3—Increasing the rate of turn without using rudder.
- 4—Not holding bottom rudder in a turn.

4037. Choose the true statement pertaining to a slip or skid in an airplane.

- 1—In a right descending turn, if excessive left rudder is applied to compensate for the decreased torque effect, a slip will result.
- 2—In a left climbing turn, if insufficient right rudder is applied to compensate for the increased torque effect, a slip will result.
- 3—A skid occurs when too much rudder is applied in the direction opposite the turn.
- 4—A skid occurs when the rate of turn is too slow for the amount of bank being used.

4038. During level turns in side-by-side airplanes, which is characteristic of student performance?

- 1—Diving during right turns because the nose appears to rise during entry into these turns.
- 2—Diving during left turns because the nose appears to rise during entry into these turns.
- 3—Climbing during left turns because the nose appears to descend during entry into these turns.
- 4—Climbing during both left and right turns because the nose appears to descend during entry into these turns.

4039. During the entry to a right turn, the nose of the aircraft swings slightly to the left before it swings along the horizon to the right. This is a

- 1—slipping entry, caused by excessive right rudder pressure.
- 2—skidding entry, caused by excessive right aileron pressure.
- 3—skidding entry; more right rudder pressure and less right aileron pressure should have been applied.
- 4—slipping entry; more right rudder pressure should have been applied for the amount of aileron pressure being used.

4040. What will cause the nose of an aircraft to move in the direction of the turn before the bank starts in a turn entry?

- 1—Rudder being applied too late.
- 2—Aileron being applied too soon.
- 3—Rudder being applied too soon.
- 4—Failure to apply back elevator pressure.

4041. How should a student be taught to correct for a nose-low attitude during a steep turn?

- 1—Apply back elevator pressure to attain the desired pitch attitude.
- 2—Add power to generate more lift.
- 3—Apply back elevator pressure to attain the desired pitch attitude, then reduce the angle of bank.
- 4—Reduce the angle of bank, then apply back elevator pressure to attain the desired pitch attitude.

4042. While holding a constant angle of bank in a coordinated turn, the displacement of the turn needle will

- 1—increase as airspeed decreases.
- 2—indicate the angle of bank.
- 3—increase as airspeed increases.
- 4—remain constant regardless of airspeed.

4043. What effect, during a constant 30° banked turn, would a reduction in airspeed have on (a) the rate of turn, and (b) the radius of turn?

- 1—The rate of turn would increase; the radius of turn would increase.
- 2—The rate of turn would increase; the radius of turn would decrease.
- 3—The rate of turn would decrease; the radius of turn would increase.
- 4—The rate of turn would decrease; the radius of turn would decrease.

4044. During a level turn, increasing the airspeed while maintaining a constant load factor would result in

- 1—an increase in radius of turn.
- 2—a decrease in radius of turn.
- 3—the same radius of turn.
- 4—an increase in centrifugal force.

4045. Which is the best technique for minimizing the wing-load factor when flying in severe turbulence?

- 1—Control altitude with power, airspeed with elevator, and accept variations of bank.
- 2—Control airspeed with power, maintain wings level, and accept variations of altitude.
- 3—Set power and trim to obtain an airspeed at or below maneuvering speed, maintain wings level, and accept variations of airspeed and altitude.
- 4—Control airspeed as closely as possible with elevator and power, and accept variations of bank and altitude.

4046. To properly compensate for a crosswind during straight-and-level cruising flight, the pilot should

- 1—fly with the downwind wing higher than the upwind wing.
- 2—hold aileron pressure toward the wind and hold opposite rudder pressure to prevent a turn.
- 3—establish a proper heading into the wind by coordinated use of the controls.
- 4—hold rudder pressure toward the wind.

4047. To minimize the side loads placed on the landing gear during touchdown, the pilot should keep the

- 1—direction of motion of the airplane parallel to the runway.
- 2—downwind wing lowered sufficiently to eliminate the tendency for the airplane to drift.
- 3—longitudinal axis of the airplane parallel to the direction of its motion.
- 4—airplane headed sufficiently into the crosswind so that the direction of motion of the airplane is parallel to the runway.

4048. Under normal conditions, a proper crosswind landing on a runway requires that, at the moment of touchdown, the

- 1—direction of motion of the airplane and its lateral axis be perpendicular to the runway.
- 2—direction of motion of the airplane and its longitudinal axis be parallel to the runway.
- 3—upwind wheel should be braked lightly to control the shifting CG.
- 4—downwind wing be lowered sufficiently to eliminate the tendency for the airplane to drift.

4049. During a power approach to a short-field landing, the correct airspeed may be verified by

- 1—the ability to land on a predetermined spot.
- 2—the ability to maintain a constant angle of descent.
- 3—little or no floating during the landing flare.
- 4—immediate response to control usage.

4050. If an emergency situation requires a downwind landing, pilots should expect a faster

- 1—groundspeed at touchdown, a longer ground roll, and the likelihood of overshooting the desired touchdown point.
- 2—airspeed at touchdown, a shorter ground roll, and the likelihood of undershooting the desired touchdown point.
- 3—airspeed at touchdown, a longer ground roll, and better control throughout the landing roll.
- 4—groundspeed at touchdown, a shorter ground roll, and the likelihood of undershooting the desired touchdown point.

4051. On final approach to landing, a faster-than-normal indicated airspeed should be used when

- 1—landing at airports above 5,000 feet MSL with above standard temperature conditions.
- 2—turbulent conditions exist.
- 3—making a power approach and a full-stall landing.
- 4—ambient temperatures are above 90° F.

4052. If poor aircraft controllability is experienced during an emergency go-around with full flaps, the cause is most probably due to

- 1—excessive airspeed with full flaps extended.
- 2—a reduction in the angle of attack with full flaps to the point where the aircraft control is greatly impaired.
- 3—the high-power, low-air-speed situation with the airplane trimmed for a full-flap configuration.
- 4—ground effect.

4053. A go-around from a poor landing approach should

- 1—generally be preferable to last minute attempts to prevent a bad landing.
- 2—not be attempted unless circumstances make it absolutely necessary.
- 3—not be attempted after the landing flare has been initiated regardless of airspeed.
- 4—not be accomplished if indicated airspeed is less than 25 MPH.

4054. During go-arounds from a full-flap approach in conventional airplanes, which procedure should be used if the flight manual does not specify differently?

- 1—Retract the gear first if heavily loaded; otherwise, retract the flaps first.
- 2—Start retracting the flaps first, then retract the gear.
- 3—Retract the gear first since it has a far greater adverse effect on aircraft performance than do flaps.
- 4—Retract the gear first and adjust flaps only after reaching a safe altitude.

4055. One reason a student tends to round-out high during landing is

- 1—focusing on references that are too close or looking directly down.
- 2—focusing on references too far ahead.
- 3—changing focus gradually.
- 4—looking up during the approach.

4056. What normally results from excessive airspeed on final approach?

- 1—Ballooning.
- 2—Bouncing.
- 3—Floating.
- 4—Hard landing.

4057. What normally results from misjudging the rate of sink during a landing?

- 1—Ballooning.
- 2—Floating.
- 3—Ground loop.
- 4—Poor directional control.

4058. What procedure should be used to correct for slight ballooning during landing?

- 1—Increase angle-of-attack.
- 2—Decrease angle-of-attack.
- 3—Decrease power.
- 4—Hold a constant landing attitude.

4059. What could be a result of a student focusing too far ahead during a landing approach?

- 1—Rounding out too high and developing an excessive sink rate.
- 2—Difficulty in judging the closeness of the ground resulting in a nose-first touchdown.
- 3—References will become blurred and there will be a tendency to overcontrol.
- 4—Reactions will be either too abrupt or too late.

4060. During an auto launch, the pitch angle of the glider should not exceed

- 1—10° at 50 feet, 20° at 100 feet, and 45° at 200 feet.
- 2—15° at 50 feet, 30° at 100 feet, and 45° at 200 feet.
- 3—15° at 50 feet, 20° at 100 feet, and 40° at 200 feet.
- 4—20° at 50 feet, 30° at 100 feet, and 45° at 200 feet.

4061. At what point during an autotow should the glider pilot establish the maximum pitch attitude for the climb?

- 1—200 feet above the ground.
- 2—Immediately after takeoff.
- 3—100 feet above the ground.
- 4—Between 300 and 400 feet above the ground.

4062. What consideration should be given in the choice of a towplane for use in aerotows?

- 1—Towplane's low-wing loading and low-power loading.
- 2— L/D_{max} of the glider to be towed.
- 3—Gross weight of the glider to be towed.
- 4—Stall speed of the towplane.

4063. Both lift and drag would be increased when which of these devices are extended?

- 1—Flaps.
- 2—Spoilers.
- 3—Dive brakes.
- 4—Slots.

4064. The reason for retaining water ballast while thermals are strong and dumping the water when thermals weaken, is to

- 1—increase the rate of descent.
- 2—decrease the rate of descent.
- 3—decrease forward speed.
- 4—increase forward speed.

4065. What is the proper speed to fly when passing through lift with no intention to work the

- 1—Maximum safe speed.
- 2—Minimum control speed.
- 3—Best L/D speed.
- 4—Minimum sink speed.

4066. When flying into a strong headwind on a long glide back to the airport, the recommended speed to use is the

- 1—minimum sink speed.
- 2—best L/D speed plus half the estimated windspeed at the glider's flight altitude.
- 3—airspeed which produces the flattest glide angle for the convective condition regardless of the wind.
- 4—best glide speed.

4067. With regard to two or more gliders flying in the same thermal, which statement is true?

- 1—All turns should be to the right.
- 2—Turns should be in the same direction as the highest glider.
- 3—Low-performance gliders have the right-of-way over high-performance gliders.
- 4—Turns should be made in the same direction as the first glider to enter the thermal.

4068. Which is true relating to the direction in which turns should be made during slope soaring?

- 1—All turns should be made downwind toward the slope.
- 2—The upwind turn should be made to the left; the downwind turn should be made to the right.
- 3—All reversing turns should be made to the left.
- 4—All reversing turns should be made into the wind away from the slope.

4069. A rule of thumb for flying a final approach is to maintain a speed that is

- 1—twice the glider's stall speed plus half the estimated windspeed.
- 2—50 percent above the glider's stall speed plus half the estimated windspeed.
- 3—twice the glider's stall speed, regardless of windspeed.
- 4—50 percent above the glider's stall speed, regardless of windspeed.

4070. Unless adequate speed control is maintained during the turn to base and the final approach for a landing into the wind, which would most likely occur if a steep wind gradient existed?

- 1—The desired landing spot would be undershot or the glider would stall.
- 2—The airspeed on final approach would increase, causing the glider to overshoot the desired landing spot.
- 3—The wingtip on the outside of the turn would stall before the wingtip on the inside of the turn.
- 4—The glider would tend to roll out of the turn.

4071. If swirling dust, leaves, or debris indicate a strong thermal on the final approach to a landing, it is recommended that the glider pilot

- 1—reduce the airspeed to the minimum sink speed.
- 2—open the spoilers and reduce the airspeed.
- 3—close the spoilers and increase the airspeed.
- 4—open the spoilers and maintain a constant airspeed.

4072. When making an off-field landing, it is recommended that the landing be accomplished

- 1—uphill, if possible, regardless of the wind direction.
- 2—at as fast a speed as possible when the field has tall grass or crops.
- 3—in cultivated fields where the crops have not yet been harvested.
- 4—in pastures which are seldom cultivated.

4073. Which would most likely ensure a safe off-field landing?

- 1—Positioning the approach pattern and turning points in accordance with the altimeter indications.
- 2—Landing in a pasture or noncultivated field rather than one in cultivation and whose crops have been harvested.
- 3—Landing into the wind, regardless of the type or slope of the terrain.
- 4—Maintaining an approach airspeed of at least 50 percent above the glider's stall speed plus half the estimated windspeed.

4074. Select the true statement concerning gyroplane taxi procedures.

- 1—The cyclic stick should be held in the neutral position at all times.
- 2—Avoid abrupt control movements when blades are turning.
- 3—The cyclic stick should be held slightly aft of neutral at all times.
- 4—Taxi on rough terrain at a slightly higher speed when the rotor blades are turning.

4075. To taxi on the surface in a safe and efficient manner, helicopter pilots should use the

- 1—collective pitch to control starting, taxi speed, and stopping.
- 2—antitorque pedals to correct for drift during crosswind conditions.
- 3—cyclic pitch to control starting, taxi speed, and stopping.
- 4—cyclic pitch to maintain heading during crosswind conditions.

4076. To taxi on the surface in a safe efficient manner, one should use the cyclic pitch to

- 1—control taxi speed.
- 2—start and stop aircraft movement.
- 3—correct for drift during crosswind conditions.
- 4—maintain heading during crosswind conditions.

4077. During a climbing turn, the engine RPM is at the desired setting, but the manifold pressure is higher than desired. To maintain the desired engine RPM and correct the manifold pressure, what initial control action should be taken?

- 1—Decrease the collective pitch and decrease the throttle.
- 2—Decrease the collective pitch only.
- 3—Decrease the collective pitch and increase the throttle.
- 4—Decrease the throttle only.

4078. If excessive right pedal is applied during an autorotative turn to the right, the nose of the helicopter will tend to

- 1—pitch down and the rotor RPM will tend to increase.
- 2—pitchup and the rotor RPM will tend to decrease.
- 3—pitch down and the rotor RPM will tend to decrease.
- 4—pitchup and the rotor RPM will tend to increase.

4079. Using right pedal to assist a right turn during an autorotative descent will probably result in what actions?

- 1—Pitchup of the nose, increase in rotor RPM, decrease in sink rate, and decrease in indicated airspeed.
- 2—Pitchup of the nose, decrease in rotor RPM, increase in sink rate, and increase in indicated airspeed.
- 3—Pitch down of the nose, increase in the rotor RPM, increase in sink rate, and decrease in indicated airspeed.
- 4—Pitch down of the nose, decrease in the rotor RPM, increase in sink rate, and increase in indicated airspeed.

4080. Choose the most correct statement pertaining to slips and skids during helicopter flight.

- 1—In a right descending turn, if insufficient right pedal is applied to compensate for the decreased torque effect, a slip will result.
- 2—A skid occurs when the rate of turn is too slow for the amount of bank being used.
- 3—In a left climbing turn, if insufficient right rudder is applied to compensate for the increased torque effect, a slip will result.
- 4—A skid occurs when too much rudder is applied in the direction opposite the turn.

4081. Immediately after takeoff, a downwind turn close to the ground is not good practice because it

- 1—increases the hazards involved should an emergency landing become necessary.
- 2—causes an increase in the speed at which rotor stall occurs.
- 3—usually produces excessive flapping in the rotor blades.
- 4—decreases the rate of climb significantly.

4082. After attaining effective translational lift during a normal takeoff, additional forward cyclic is required as the airspeed increases. Why is this action required?

- 1—To counteract the increase in lift which would result in the nose rising.
- 2—To counteract the dissymmetry of lift which causes the helicopter to roll to the left.
- 3—To counteract the adverse effects of pendular action.
- 4—To counteract gyroscopic precession.

4083. The collective pitch control should be used to

- A. correct for loss of lift during level turns at altitude.
- B. maintain desired engine power.
- C. correct a high rotor RPM during autorotations from altitude.

The correct statement(s) is(are)

- 1—A only.
- 2—A and B only.
- 3—A, B, and C.
- 4—B only.

4084. The antitorque pedals should be used to

- A. maintain heading during cruise flight.
- B. correct for loss of torque during autorotations.
- C. maintain heading during crosswind takeoffs and approaches.

The correct statement(s) is(are)

- 1—A only.
- 2—B and C only.
- 3—A and C only.
- 4—A, B, and C.

4085. During the full-flare portion of a power-off landing, the rotor RPM tends to

- 1—increase initially.
- 2—decrease initially.
- 3—remain constant.
- 4—Decrease during high density altitude days, and increase during low density altitude days.

4086. During a normal approach to a hover, the cyclic pitch control is used primarily to

- 1—control rate of closure.
- 2—maintain heading.
- 3—control angle of descent.
- 4—prevent loss of translational lift.

4087. Which statement best describes the function of the controls during a powered approach to hover?

- 1—Cyclic pitch primarily controls rate of descent; collective pitch primarily controls angle of descent and groundspeed.
- 2—Collective pitch primarily controls angle of descent; rotor RPM primarily controls rate of descent; cyclic pitch primarily controls groundspeed.
- 3—Collective pitch primarily controls angle of descent; cyclic pitch primarily controls groundspeed.
- 4—Cyclic pitch primarily controls angle of descent and groundspeed; collective pitch primarily controls rate of descent.

4088. On a power-off final approach, a pilot establishes a glide attitude which is too flat. The proper recovery procedure for the subsequent high rate of descent is to

- 1—initiate the landing flare earlier and complete it at a slower than normal rate in order to hold G force to a minimum.
- 2—increase power, and if altitude permits, lower the nose.
- 3—lower the nose immediately, but do not increase the power since this will again raise the nose.
- 4—increase rotor lift by applying aft cyclic pressure.

4089. When autorotating during high density altitude or strong gusty wind conditions, a slightly higher-than-normal airspeed is recommended because the

- 1—resulting glide angle will approximate that of a slightly reduced airspeed under conditions of light loads, low density altitude, or calm wind.
- 2—higher rotor speed will result in an extended glide.
- 3—lower rotor speed will cause the rate of descent to approximate that of a slightly increased rotor speed under conditions of light loads, low density altitude, or calm wind.
- 4—resulting slower rate of descent will allow more time for the pilot to estimate the touchdown point.

4090. During a flare autorotative descent and landing, additional right pedal is required to maintain heading after initial collective pitch is applied. This action is necessary because of

- 1—the Coriolis effect of the main rotor blades during autorotation.
- 2—translating tendency of helicopters during autorotation.
- 3—gyroscopic precession.
- 4—the reduction in rotor RPM.

4091. Which statement is true concerning a gyroplane?

- 1—A gyroplane can take off from any area in which it can safely land.
- 2—Rotor RPM will remain constant during changes in airspeed while descending.
- 3—A gyroplane is capable of getting into a settling-with-power situation much the same way as a helicopter.
- 4—A gyroplane can safely descend vertically or move backward with respect to ground references during a descent if altitude permits.

4092. Of the following situations, which would require the highest power setting to hover?

- 1—Headed downwind in moderate windspeeds.
- 2—Over tall grass in moderate windspeeds.
- 3—Headed crosswind in moderate windspeeds.
- 4—Over tall grass in zero wind conditions.

4093. The antitorque system fails during cruising flight and a powered approach landing is commenced. If the helicopter yaws to the right just prior to touchdown, what could the pilot do to help swing the nose to the left?

- 1—Decrease airspeed.
- 2—Increase collective pitch.
- 3—Increase the throttle.
- 4—Decrease the throttle.

4094. What corrective action should be taken if the antitorque system should fail while at a hover?

- 1—Apply left pedal as necessary to stop the torque-induced turn to the right.
- 2—Lower the collective pitch to reduce the load on the main rotor blades.
- 3—Turn the magnetos to the OFF position to stop the torque-induced turn to the right.
- 4—Close the throttle and autorotate.

4095. In the event a running landing is performed during crosswind conditions, proper landing technique requires that the

- 1—longitudinal axis of the gyroplane be parallel to the runway.
- 2—upwind wheel should be braked lightly to control the tendency of the crosswind to shift the CG.
- 3—lateral axis of the gyroplane be parallel to the gyroplane's direction of motion.
- 4—direction of gyroplane motion and heading coincide with runway direction.

4096. A running or roll-on landing in a gyroplane should be considered

- 1—an unsafe maneuver except in calm or light wind conditions.
- 2—a normal and acceptable maneuver if proper conditions relating to landing surface and groundspeed exist.
- 3—only in the event of an engine failure.
- 4—an unsafe maneuver if the airspeed is less than 45 MPH.

4097. During a running takeoff in a crosswind, which describes proper control technique?

- 1—Cyclic stick controls both heading and direction of movement.
- 2—Heading is maintained with pedals; direction of movement (groundpath or track) is maintained with cyclic.
- 3—Heading is maintained with cyclic; direction of movement (groundpath or track) is maintained with pedals.
- 4—Pedals control both heading and direction of movement.

4098. How should the rotor RPM be controlled during a running landing?

- 1—Normal operating RPM should be maintained until the helicopter stops, primarily to ensure adequate directional control.
- 2—Normal operating RPM should be maintained during the landing roll or skid, primarily to ensure that sufficient lift is available should an emergency develop.
- 3—The rotor RPM should be permitted to decrease slowly, once the helicopter is on the ground, to allow the full weight of the helicopter to settle on the skids.
- 4—Once the helicopter is on the ground it is not necessary to maintain normal operating RPM.

4099. When making a slope landing, the cyclic pitch control should be used to

- 1—place the rotor disc parallel to the slope.
- 2—hold the upslope skid against the slope.
- 3—lower the downslope skid to the ground.
- 4—maintain heading throughout the maneuver.

4100. The steepness of the slope on which a helicopter with skid-type landing gear can land is most dependent on

- 1—the position of the CG.
- 2—the amount of lateral cyclic stick travel available.
- 3—its gross weight.
- 4—the density altitude.

4101. As the upslope skid touches the ground during a slope landing, the

- 1—cyclic pitch control should remain stationary to keep the aircraft from moving.
- 2—antitorque pedals should remain stationary so the heading will not vary.
- 3—collective pitch control should be used to lower the downslope skid to the ground.
- 4—collective pitch should remain stationary and the cyclic pitch control should be used to lower the downslope skid to the ground.

4102. What type approach should be made to a rooftop heliport under conditions of relatively high wind and turbulence?

- 1—A normal approach.
- 2—A steeper-than-normal approach.
- 3—A shallower-than-normal approach.
- 4—A shallow approach, with higher-than-normal airspeed.

4103. At the onset of blade stall vibration, which corrective measures should the pilot take?

- 1—Reduce collective pitch, increase rotor RPM, and increase forward airspeed.
- 2—Increase collective pitch, increase rotor RPM, and reduce forward airspeed.
- 3—Reduce collective pitch, decrease rotor RPM, and reduce forward airspeed.
- 4—Reduce collective pitch, increase rotor RPM, and reduce forward airspeed.

4104. What are the major indications of an incipient retreating blade stall situation, in order of occurrence?

- 1—Slow pitchup of the nose, high-frequency vibration, and a tendency for the helicopter to roll.
- 2—Low-frequency vibration, pitchup of the nose, and a tendency for the helicopter to roll.
- 3—Slow pitchup of the nose, tendency for the helicopter to roll, followed by a medium-frequency vibration.
- 4—High-frequency vibration, pitch down of the nose, and a tendency for the helicopter to roll.

4105. When operating at high forward airspeed, retreating blade stall is more likely to occur under conditions of

- 1—high gross weight, low RPM, and turbulent air.
- 2—high gross weight, high RPM, and smooth air.
- 3—low gross weight, low RPM, and low-density altitude.
- 4—low gross weight, high RPM, and high-density altitude.

4106. If complete power failure occurs while at cruising altitude, the collective pitch should be lowered, as necessary, to

- 1—uncouple the main rotor system from the engine.
- 2—produce a downward flow of air through the rotor system.
- 3—reduce the pitch on all main rotor blades so that proper rotor RPM can be maintained.
- 4—engage the free-wheeling unit so that proper rotor RPM can be maintained.

4107. Why should the integrated method of flight instruction be used during student training?

- 1—It fully prepares the student for flight in instrument weather conditions.
- 2—It develops proper habit patterns of instrument interpretation and aircraft control.
- 3—It encourages students to concentrate on flying by reference to instruments.
- 4—It prevents the formation of firm habit patterns.

4108. A high degree of aircraft control is required to ensure safe flight. Select the instructing technique that is recommended to help a student develop this skill.

- 1—Use of different type of aircraft during training flight.
- 2—Use of distractions during training flight.
- 3—Scheduling the student with several different instructors during flight training.
- 4—Demonstrating each new maneuver several times before permitting student practice.

4109. During training flights, an instructor should interject distractors to determine if the student can

- 1—be easily discouraged.
- 2—learn despite stressful conditions.
- 3—recover promptly from an accidental stall/spin.
- 4—maintain aircraft control while his/her attention is diverted.

4110. During S-turn practice, an acceptable example of interjecting a distracting situation is to request the student to

- 1—identify certain objects on the ground.
- 2—close his/her eyes during course reversal.
- 3—fly at minimum controllable airspeed.
- 4—change airspeed during course reversal.

4111. When beginning a rectangular course, the determining factor in deciding the distance from the field boundary at which an aircraft should be flown is the

- 1—steepness of the bank desired in the turns.
- 2—size of the rectangular area chosen.
- 3—windspeed.
- 4—type of aircraft being used.

4112. In flying the rectangular course illustrated in figure 47, when would the aircraft be turned less than 90°?

- 1—Corners 1 and 4.
- 2—Corners 2 and 3.
- 3—Corners 1 and 2.
- 4—Corners 2 and 4.

4113. In flying the rectangular course illustrated in figure 47, when would the aircraft be turned more than 90°?

- 1—Corners 1 and 2.
- 2—Corners 2 and 3.
- 3—Corners 1 and 3.
- 4—Corners 2 and 4.

4114. In flying the rectangular course illustrated in figure 47, when should the aircraft bank vary from a steep bank to a medium bank?

- 1—Corners 2 and 3.
- 2—Corner 1.
- 3—Corner 2.
- 4—Corner 3.

4115. In flying the rectangular course illustrated in figure 47, which would describe the proper angle of bank?

- 1—Corner 1 steep to medium, corner 2 medium to shallow, corner 3 shallow to medium, and corner 4 medium to steep.
- 2—Corner 1 shallow, corner 2 medium, corner 3 steep, and corner 4 shallow.
- 3—Corner 1 shallow to medium, corner 2 medium to steep, corner 3 steep to medium, and corner 4 medium to shallow.
- 4—Corner 1 shallow, corner 2 medium to steep, corner 3 steep, and corner 4 medium to shallow.

4116. Figure 48 is a ground track for a turn around a point. The wing (lateral axis) will be in alignment with the pylon at which of the lettered positions?

- 1—D only.
- 2—B and D.
- 3—A and C.
- 4—A, B, C, and D.

4117. If you instruct a student to practice turns around a point using a bank that is not to exceed 45° at its steepest point, it would be best to start at which of the lettered positions shown in figure 48?

- 1—A or D.
- 2—B or D.
- 3—A only.
- 4—B or C.

4118. Referring to figure 49, the groundspeed will be equal in which of the following pairs of positions?

- 1—1 and 5, 2 and 4, 6 and 8.
- 2—1 and 5, 2 and 8, 4 and 6.
- 3—1 and 5, 2 and 6, 4 and 8.
- 4—1 and 5 only.

4119. (Refer to figure 49.) The angle of bank will be most nearly equal in which pair of positions?

- 1—3 and 7.
- 2—1 and 5.
- 3—4 and 8.
- 4—4 and 6.

4120. (Refer to figure 50.) With the wind as shown and the bank constant throughout the turn, which of the ground tracks illustrated would be most probable?

- 1—A.
- 2—B.
- 3—C.
- 4—D.

4121. (Refer to figure 51.) In which of the following pairs of positions will the groundspeeds be equal?

- 1—A and F, B and E only.
- 2—A and F, B and E, C and D.
- 3—B and E only.
- 4—A and B, D and E, E and F.

4122. (Refer to figure 51.) The angle of bank should vary throughout the turn if proper ground track is to be maintained during S-turn practice. Which positions require the steeper angle of bank?

- 1—C and D.
- 2—B and E.
- 3—D and E.
- 4—A and F.

4123. (Refer to figure 51.) Proper execution of S-turns across a road requires that the aircraft be crabbed into the wind the greatest amounts at which of the following points?

- 1—A and D.
- 2—C and D.
- 3—A and F.
- 4—B and E.

4124. (Refer to figure 52.) While practicing S-turns, a consistently smaller half-circle is made on one side of the road than on the other, and this turn is not completed before crossing the road or reference line. This would most likely occur in turn

- 1—X-Y-Z because the bank is increased too slowly during the latter part of the turn.
- 2—X-Y-Z because the bank is increased too rapidly during the early part of the turn.
- 3—U-V-W because the bank is decreased too rapidly during the latter part of the turn.
- 4—U-V-W because the bank is increased too slowly during the early part of the turn.

4125. In properly coordinated eights-on-pylons, if the reference point is behind the pylon it means the

- 1—airplane is above the pivotal altitude.
- 2—airplane is below the pivotal altitude.
- 3—angle of bank is too shallow.
- 4—airspeed is too fast.

4126. While performing eights-on-pylons, the turn-and-slip indicator appears as shown in figure 53. The pilot must

- 1—decrease the bank to hold the reference point on the pylon without slipping, because the radius of turn is too small.
- 2—increase altitude to obtain the correct pivotal altitude, and correct the skidding turn.
- 3—decrease altitude to obtain the correct pivotal altitude, and correct the slipping turn.
- 4—decrease the bank to turn back the wing, which has crept ahead of the pylon.

4127. The pivotal altitude for eights-on-pylons is dependent primarily upon the

- 1—true airspeed.
- 2—groundspeed.
- 3—distance from the pylon.
- 4—degree of bank.

4128. If the wing moves behind the pylon during properly coordinated eights-on-pylons, the airplane is

- 1—below pivotal altitude.
- 2—above pivotal altitude.
- 3—too close to the pylon.
- 4—flying too fast.

4129. Misuse of rudder in attempting to hold the pylon during the performance of eights-on-pylons will generally result in the turn-and-slip indicator appearing as shown in which position of figure 54.

- 1—"A" if below pivotal altitude; "B" if above pivotal altitude.
- 2—"A" if above or below pivotal altitude.
- 3—"A" if above pivotal altitude; "B" if below pivotal altitude.
- 4—"B" if above or below pivotal altitude.

4130. The objective of a cross-control stall demonstration is to

- 1—emphasize the hazard of an excessive slip during a landing approach.
- 2—teach the proper recovery technique should this type of stall occur during final approach.
- 3—show the effect of improper control technique and emphasize the importance of coordinated control when making turns.
- 4—show the result of using too steep an angle of bank when making turns close to the ground.

4131. Two distinct flight situations should be covered when teaching slow flight. These are the establishment and maintenance of

- 1—a speed at which the airplane is operating on the back side of the power curve, and a speed at which the elevator control can be held full-back with no further loss of control.
- 2—airspeeds appropriate for landing approaches, and flight at minimum controllable speeds.
- 3—maneuvering speed, and the best rate-of-climb or best angle-of-climb speeds.
- 4—an airspeed which gives a stall warning indication, and a speed at which complete recovery can be made from stalls.

4132. The primary purpose of practicing operations at minimum controllable airspeeds is to enable students to

- 1—develop proficiency at anticipating the onset of power-on stalls.
- 2—safely fly airport traffic patterns at various airspeeds.
- 3—become familiar with appropriate control techniques for such speeds, and the rapidity with which control effectiveness can be lost.
- 4—quickly develop the skills required for effective directional control during the takeoff run.

4133. If an accelerated stall occurs in a steep turn, how will the airplane respond?

- 1—Both wings are flying at the same angle of attack; therefore, they will stall at the same time.
- 2—In a slip, the high wing stalls first; in a skid, the low wing stalls first; in coordinated flight, both wings stall at the same time.
- 3—The inside wing stalls first because it is flying at a higher angle of attack.
- 4—The outside wing stalls first because it is flying at a higher angle of attack.

4134. If an accelerated stall occurs during a steep turn, in which direction would the airplane tend to roll?

- 1—Toward the inside of the turn.
- 2—Toward the outside of the turn.
- 3—In neither direction. The nose will pitch away from the pilot as it does when a stall occurs in straight flight.
- 4—The direction of roll depends on whether the airplane is slipping, skidding, or in coordinated flight.

4135. Students should be taught that throughout a level, 720° power turn to the right, the rudder is normally used to

- 1—prevent yawing.
- 2—control the rate of turn.
- 3—hold the airplane in the turn once it is established.
- 4—maintain a constant altitude.

4136. Pilots who initiate a chandelle with a bank that is too steep will most likely

- 1—turn more than 180° before completing the rollout.
- 2—perform a comparatively level steep turn with a nose-high rollout at the 180° point.
- 3—complete the maneuver before turning 180°.
- 4—stall before completing the maneuver.

4137. What may occur if the initial bank is too shallow when performing a chandelle?

- 1—Stalling the aircraft before reaching the 180° point.
- 2—Completing the maneuver with excessive airspeed.
- 3—All turn and little climb.
- 4—Completing the maneuver with too low a pitch attitude.

4138. When performing a chandelle where should maximum pitch occur?

- 1—30° point.
- 2—45° point.
- 3—90° point.
- 4—180° point.

4139. Which best describes pitch and bank during the first 90° of a chandelle?

- 1—Constant pitch and changing bank.
- 2—Constant pitch and bank.
- 3—Constant bank and changing pitch.
- 4—Changing pitch and bank.

4140. Which best describes the pitch and bank during the second 90° of a chandelle?

- 1—Constant pitch and changing bank.
- 2—Constant pitch and bank.
- 3—Constant bank and changing pitch.
- 4—Changing pitch and bank.

4141. When performing a lazy eight, where should the maximum pitchup attitude occur?

- 1—45° point.
- 2—90° point.
- 3—135° point.
- 4—180° point.

4142. When performing a lazy eight, when should the aircraft be at minimum airspeed?

- 1—45° point.
- 2—90° point.
- 3—135° point.
- 4—180° point.

4143. When performing a lazy eight, where should the maximum pitch down attitude occur?

- 1—45° point.
- 2—90° point.
- 3—135° point.
- 4—180° point.

4144. When performing a lazy eight, when should the maximum altitude occur?

- 1—45° point.
- 2—90° point.
- 3—135° point.
- 4—180° point.

4145. When performing a lazy eight, when should the altitude be the same as the entry altitude?

- 1—45° point.
- 2—90° point.
- 3—135° point.
- 4—180° point.

4146. What should occur at the 90° point of a lazy eight?

- 1—Airspeed and altitude should be the same as at entry.
- 2—Maximum pitch attitude, minimum airspeed, and minimum bank.
- 3—Maximum pitch down attitude, steepest bank, and highest airspeed.
- 4—Steepest bank, minimum airspeed, maximum altitude, and level pitch attitude.

4147. What would cause the 45° point to be reached before the maximum pitchup attitude during a lazy eight?

- 1—Beginning with too slow a rate of roll.
- 2—Beginning with too rapid a rate of roll.
- 3—Allowing the airspeed to remain too high causing the rate of turn to increase.
- 4—Not using adequate rudder pressure in the direction of the turn.

4148. During practice of lazy eights, the most probable cause of the uncoordinated situation at the completion of 90° of turn (indicated by the turn-and-slip indicator shown in figure 55) is the

- 1—failure to constantly adjust control pressures for torque and airspeed.
- 2—use of too much right rudder control pressure.
- 3—application of cross-control pressure.
- 4—use of too much left aileron control pressure.

4149. Which is the most probable result if a pilot initiates the climbing turn portions of the lazy eight with banks that are too steep?

- 1—Attaining a pitch attitude that is too steep and stalling at the top of the climbing turn.
- 2—Completing each 180° change of direction with a net gain of altitude.
- 3—Turning at a rate too fast for the rate of climb and therefore, completing each 180° change of direction with excessive airspeed.
- 4—Overcompensating by turning at a rate too slow for the rate of climb.

4150. At what point, if ever, in a lazy eight is it most likely that it will be necessary to exert opposing aileron and rudder pressures in order to maintain coordinated flight?

- 1—It should never be necessary.
- 2—At the point of slowest speed.
- 3—At the point of fastest speed.
- 4—At the point of lowest pitch attitude.

4151. Which statement pertaining to rapid decelerations (quick stops) is most accurate?

- 1—The nose of the helicopter will normally tend to yaw to the right during the entry and tend to yaw to the left during the completion of the maneuver.
- 2—The primary purpose of this maneuver is to lose effective translational lift.
- 3—The rotor RPM will normally tend to increase during the entry and tend to decrease during the completion of the maneuver.
- 4—As collective pitch is lowered during the recovery, left pedal should be applied to maintain the heading.

4152. Dual instruction and solo practice on quick stops should usually be accomplished headed upwind

- 1—between 100 feet and 200 feet above the surface.
- 2—and only during low density altitude conditions.
- 3—at least 500 feet above the surface.
- 4—at an altitude that will permit a safe clearance between the tail rotor and the ground throughout the maneuver.

4153. Recovery from settling with power should be initiated by

- 1—increasing forward airspeed and/or partially lowering the collective pitch.
- 2—increasing forward airspeed and/or partially raising the collective pitch.
- 3—decreasing forward airspeed and/or partially raising the collective pitch.
- 4—entering autorotation.

4154. Under which situation is a helicopter most likely to enter the condition known as settling with power?

- 1—While maintaining forward cruising airspeed with a rate of descent in excess of 300 ft/min.
- 2—While maintaining a forward airspeed of less than 10 MPH with a rate of descent in excess of 300 ft/min.
- 3—While hovering in ground effect.
- 4—While maintaining altitude and a forward airspeed of less than 10 MPH.

APPENDIX 1

**DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

SUBJECT MATTER KNOWLEDGE CODES

To determine the knowledge area in which a particular question was incorrectly answered, compare the subject matter code(s) on AC Form 8080-2, Airmen Written Test Report, to the subject matter outline that follows. The total number of test items missed may differ from the number of subject matter codes shown on the AC Form 8080-2, since you may have missed more than one question in a certain subject matter code.

FAR 1	Definitions and Abbreviations	FAR 71	Designation of Federal Airways, Area Low Routes, Controlled Airspace, and Reporting Points
A01	General Definitions	A60	General
A02	Abbreviations and Symbols	A61	Airport Radar Service Areas
FAR 23	Airworthiness Standards: Normal, Utility, and Acrobatic Category Aircraft	FAR 73	Special Use Airspace
A10	General	A70	General
FAR 43	Maintenance, Preventive Maintenance, Rebuilding and Alteration	A71	Restricted Areas
A15	General	A72	Prohibited Areas
A16	Appendices	FAR 75	Establishment of Jet Routes and Area High Routes
FAR 61	Certification: Pilots and Flight Instructors	A80	General
A20	General	FAR 77	Objects Affecting Navigable Airspace
A21	Aircraft Ratings and Special Certificates	A90	General
A22	Student Pilots	FAR 91	General Operating Rules
A23	Private Pilots	B01	General
A24	Commercial Pilots	B02	Flight Rules
A25	Airline Transport Pilots	B03	Maintenance, Preventive Maintenance, and Alterations
A26	Flight Instructors	B04	Large and Turbine-Powered Multiengine Airplanes
A27	Appendix A: Practical Test Requirements for Airline Transport Pilot Certificates and Associated Class and Type Ratings	B05	Operating Noise Limits
A28	Appendix B: Practical Test Requirements for Rotorcraft Airline Transport Pilot Certificates with a Helicopter Class Rating and Associated Type Ratings	B06	Appendix A: Category II Operations Manual, Instruments, Equipment, and Maintenance
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L02	AC 61-10, Private and Commercial Pilots Refresher Courses	L56	AC 91-42, Hazards of Rotating Propeller and Helicopter Rotor Blades
L03	AC 61-12, Student Pilot Guide	L57	AC 91-43, Unreliable Airspeed Indications
L04	AC 61-47, Use of Approach Slope Indicators for Pilot Training	L58	AC 91-44, Operational and Maintenance Practices for Emergency Locator Transmitters and Receivers
L05	AC 61-65, Certification: Pilot and Flight Instructors	L59	AC 91-46, Gyroscopic Instruments — Good Operating Practices
L06	AC 61-66, Annual Pilot In Command Proficiency Checks	L60	AC 91-49, General Aviation Procedures for Flight in North Atlantic Minimum Navigation Performance Specifications Airspace
L07	AC 61-67, Hazards Associated with Spins in Airplanes Prohibited from Intentional Spinning	L61	AC 91-50, Importance of Transponder Operation and Altitude Reporting
L08	AC 61-84, Role of Preflight Preparation	L62	AC 91-51, Airplane Deice and Anti-Ice Systems
L09	AC 61-89, Pilot Certificates: Aircraft Type Ratings	L63	AC 91-53, Noise Abatement Departure Profile
L10	AC 61-92, Use of Distractions During Pilot Certification Flight Tests	L64	AC 91-55, Reduction of Electrical System Failures Following Aircraft Engine Starting
L11	AC 61-94, Pilot Transition Course for Self-Launching or Powered Sailplanes (Motor Gliders)	L65	AC 91-58, Use of Pyrotechnic Visual Distress Signaling Devices in Aviation
L20	AC 67-1, Medical Information for Air Ambulance Operators	L66	AC 91-64, Use of Remote Altimeter Settings Instrument Approach Procedures
L30	AC 90-23, Aircraft Wake Turbulence	L67	AC 91-83, Canceling or Closing Flight Plans
L31	AC 90-34, Accidents Resulting from Wheelbarrowing in Tricycle-Gear Equipped Aircraft	L70	AC 97-1, Runway Visual Range (RVR)
L32	AC 90-42, Traffic Advisory Practices at Nontower Airports	L80	AC 103-4, Hazard Associated with Sublimation of Solid Carbon Dioxide (Dry Ice) Aboard Aircraft
L33	AC 90-45, Approval of Area Navigation Systems for Use in the U.S. National Airspace System	L81	AC 103-6, Ultralight Vehicle Operations Airports, ATC, and Weather
L34	AC 90-48, Pilots' Role in Collision Avoidance	L82	AC 103-7, The Ultralight Vehicle
L35	AC 90-58, VOR Course Errors Resulting from 50 kHz Channel Mis-Selection	M01	AC 120-12, Private Carriage Versus Common Carriage of Persons or Property
L36	AC 90-66, Recommended Standard Traffic Patterns for Airplane Operations at Uncontrolled Airports	M02	AC 120-27, Aircraft Weight and Balance Control
L37	AC 90-67, Light Signals from the Control Tower for Ground Vehicles, Equipment, and Personnel	M03	AC 120-29, Criteria for Approving Category I and Category II Landing Minima for FAR 121 Operators
L38	AC 90-79, Recommended Practices and Procedures for the Use of Electronic Long Range Navigation Equipment	M04	AC 120-32, Air Transportation of Handicapped Persons
L39	AC 90-82, Random Area Navigation Routes	M10	AC 121-6, Portable Battery-Powered Megaphones
L40	AC 90-83, Terminal Control Areas (TCA)	M11	AC 121-24, Passenger Safety Information Briefing and Briefing Cards
L41	AC 90-85, Severe Weather Avoidance Plan (SWAP)	M12	AC 121-25, Additional Weather Information: Domestic and Flag Air Carriers
L42	AC 90-87, Helicopter Dynamic Rollover	M13	AC 121-195, Alternate Operational Landing Distances for Wet Runways; Turbojet Powered Transport Category Airplanes

Appendix 1

M30	AC 135-3, Air Taxi Operators and Commercial Operators
M31	AC 135-9, FAR Part 135 Icing Limitations
M32	AC 135-12, Passenger Information, FAR Part 135: Passenger Safety Information Briefing and Briefing Cards
M40	AC 150/5345-28, Precision Approach Path Indicator (PAPI) Systems
M50	AC 20-34, Prevention of Retractable Landing Gear Failures

American Soaring Handbook - Gliders

N01	A History of American Soaring
N02	Training
N03	Ground Launch
N04	Airplane Tow
N05	Meteorology
N06	Cross-Country and Wave Soaring
N07	Instruments and Oxygen
N08	Radio, Rope, and Wire
N09	Aerodynamics
N10	Maintenance and Repair

Soaring Flight Manual - Gliders

N20	Sailplane Aerodynamics
N21	Performance Considerations
N22	Flight Instruments
N23	Weather for Soaring
N24	Medical Factors
N25	Flight Publications and Airspace
N26	Aeronautical Charts and Navigation
N27	Computations for Soaring
N28	Personal Equipment
N29	Preflight and Ground Operations
N30	Aerotow Launch Procedures
N31	Ground Launch Procedures
N32	Basic Flight Maneuvers and Traffic Patterns
N33	Soaring Techniques
N34	Cross-Country Soaring

Taming The Gentle Giant - Balloons

O01	Design and Construction of Balloons
O02	Fuel Source and Supply
O03	Weight and Temperature
O04	Flight Instruments
O05	Balloon Flight Tips
O06	Glossary

Balloon Federation Of America - Flight Instructor Manual

O10	Flight Instruction Aids
O11	Human Behavior and Pilot Proficiency
O12	The Flight Check and the Designated Examiner

The Balloon Federation Of America Handbook - Propane Systems

O20	Propane Glossary
O21	Chemical and Physical Systems

O22	Cylinders
O23	Lines and Fittings
O24	Valves
O25	Regulators
O26	Burners
O27	Propane Systems - Schematics
O28	Propane References

The Balloon Federation Of America Handbook - Avoiding Powerline Accidents

O30	Excerpts
-----	----------

Balloon Flight Manual

O40	Excerpts
-----	----------

Airship Operations Manual

P01	Buoyancy
P02	Aerodynamics
P03	Free Ballooning
P04	Aerostatics
P05	Envelope
P06	Car
P07	Powerplant
P08	Airship Ground Handling
P09	Operating Instructions
P10	History

International Flight Information Manual

Q01	Passport and Visa
Q02	International NOTAM Availability and Distribution
Q03	National Security
Q04	International Interception Procedures
Q05	Intercept Pattern for Identification of Transport Aircraft
Q06	Flight Planning Notes
Q07	North Atlantic Minimum Navigation Requirements
Q08	North American Routes for North Atlantic Traffic
Q09	U.S. Aeronautical Telecommunications Services
Q10	Charts and Publications for Flights Outside the U.S.
Q11	Oceanic Long-Range Navigation Information

Aerodynamics For Naval Aviators, NAVWEPS 00-80T-80

R01	Wing and Airfoil Forces
R02	Planform Effects and Airplane Drag
R10	Required Thrust and Power
R11	Available Thrust and Power
R12	Items of Airplane Performance
R21	General Concepts and Supersonic Flow Patterns
R22	Configuration Effects
R31	Definitions
R32	Longitudinal Stability and Control
R33	Directional Stability and Control
R34	Lateral Stability and Control

R35	Miscellaneous Stability Problems
R40	General Definitions and Structural Requirements
R41	Aircraft Loads and Operating Limitations
R50	Application of Aerodynamics to Specific Problems of Flying
S01	Reserved
T10	Reserved
U01	Reserved
V01	Reserved
W01	Reserved
X01	Reserved
Y01	Reserved
Z01	Visual Flight Rules Chart Users Guide

Z02 Pilot's Guide to IVRS

NOTE: Most of the references and study materials listed in these subject matter knowledge codes are available through government outlets such as U.S. Government Printing Office bookstores. AC 00-2, Advisory Circular Checklist, transmits the status of all FAA AC's (advisory circulars), as well as FAA internal publications and miscellaneous flight information such as AIM, Airport/Facility Directory, written test question books, practical test standards, and other material directly related to a certificate or rating. To obtain a free copy of the AC 00-2, send your request to:

U.S. Department of Transportation
Utilization and Storage Section, M-443.2
Washington, DC 20590

APPENDIX 2

GROUND REFERENCE LESSON MANEUVERS		STUDENT	DATE
A	_____	• TO DEVELOP THE STUDENT'S SKILL IN PLANNING AND FOLLOWING A PATTERN OVER THE GROUND COMPENSATING FOR WIND DRIFT AT VARYING ANGLES	
B	_____	• USE OF GROUND REFERENCES TO CONTROL PATH • OBSERVATION AND CONTROL OF WIND EFFECT • CONTROL OF AIRPLANE ATTITUDE, ALTITUDE, AND HEADING	
C	_____	• PREFLIGHT DISCUSSION : 10 • INSTRUCTOR DEMONSTRATIONS : 25 • STUDENT PRACTICE : 45 • POSTFLIGHT CRITIQUE : 10	
D	_____	• CHALKBOARD FOR PREFLIGHT DISCUSSION • IFR VISOR FOR MANEUVERS REVIEWED	
E	_____	• PREFLIGHT-DISCUSS LESSON OBJECTIVE. DIAGRAM "S" TURNS, EIGHTS ALONG A ROAD, AND RECTANGULAR COURSE ON CHALKBOARD • INFLIGHT-DEMONSTRATE ELEMENTS. DEMONSTRATE FOLLOWING A ROAD, "S" TURNS, EIGHTS ALONG A ROAD, AND RECTANGULAR COURSE. COACH STUDENT PRACTICE • POSTFLIGHT-CRITIQUE STUDENT PERFORMANCE AND MAKE STUDY ASSIGNMENT	
F	_____	• PREFLIGHT-DISCUSS LESSON OBJECTIVE AND RESOLVE QUESTIONS • INFLIGHT-REVIEW PREVIOUS MANEUVERS INCLUDING POWER-OFF STALLS AND FLIGHT AT MINIMUM CONTROLLABLE AIRSPEED. PERFORM EACH NEW MANEUVER AS DIRECTED. • POSTFLIGHT-ASK PERTINENT QUESTIONS	
G	_____	• STUDENT SHOULD DEMONSTRATE COMPETENCY IN MAINTAINING ORIENTATION, AIRSPEED WITHIN 10 KNOTS, ALTITUDE WITHIN 100 FEET, AND HEADINGS WITHIN 10 DEGREES, AND IN MAKING PROPER CORRECTION FOR WIND DRIFT.	

FIGURE 1.—Lesson Plan.

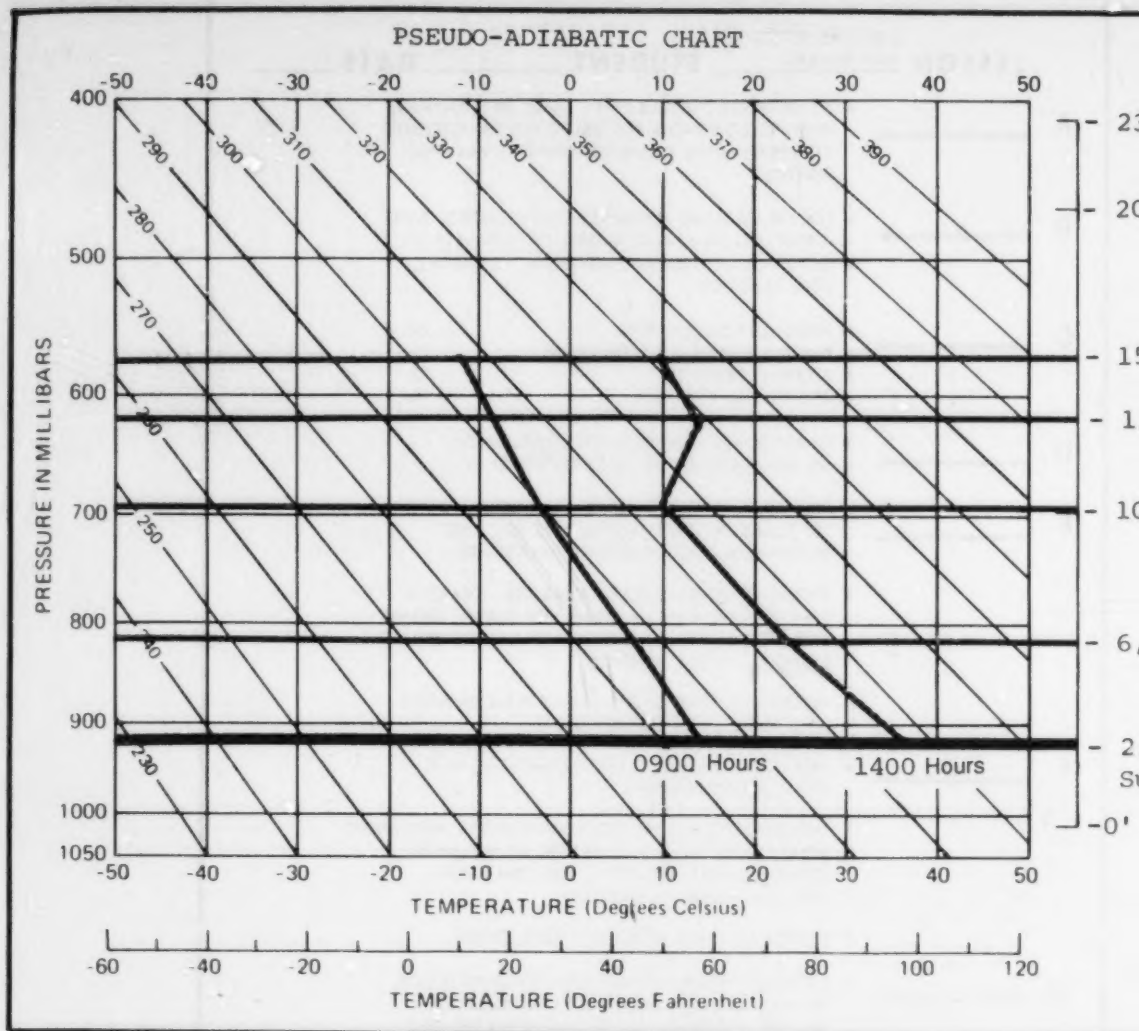


FIGURE 2.—Pseudo-Adiabatic Chart.

SELECTED SURFACE AVIATION WEATHER REPORTS

SA 301701

FTW SA 1654 -X M6 OVC 11/2HK 69/63/0904/010/ F2 TWR VSBY 21/2 CIG RGD

DFW SA 1646 M8 OVC 4F 193/68/64/1105/0111

DAL SA 1649 M9 OVC 4FH 72/63/0000/010

TYR SA 1650 -X 15 SCT 3F 76/66/0804/999/F2

ABI SA 1651 30 SCT E200 OVC 25 168/74/51/1614/008 CB W-N

AMA SA 1651 M5 OVC 4F 217/51/48/0516/023/LB26E40

AUS RS 1651 M10 BKN 24 BKN 160 OVC 4R-H 169/70/63/1208/005/RB25

BKO SA 1655 20 SCT 130 SCT E250 OVC 7 149/85/67/1515G20/997/RB19E25

TCU ALQDS

FIGURE 3.—Surface Aviation Weather Reports.

PILOT REPORTS

UA /OV DAL 090015 1725 FL090 /TP BE55 /SK 045 OVC 085 CLR ABV

UA /OV ABI 270015 1845 FL120 /TP C411 /TB MDT BLO-100

UA /OV AUS 315020 1715 FL150 /TP C500 /SK OVC 130 /IC TRACE RIME

DURGC WBND 090-130

UA /OV BRO 360030 1700 FL045 /TP PA31 /SK 050 OVC /RM LRG TSTM

50N BRO 20 WIDE

FIGURE 4.—Pilot Reports.

SELECTED TERMINAL FORECASTS

FT 300940

ABI 301010 C250 BKN 1413. 12Z 20 SCT C100 BKN 1615 CHC C14 OVC 1TRW. 18Z 30 SCT C100 BKN 1716 CHC C10 OVC 1TRW. 02Z 80 SCT C250 BKN 04Z VFR . .

ACT 301010 C1 X 1/2F VRBL C7 BKN 3F. 17Z C20 BKN CHC C12 OVC 2TRW. 04Z VFR CIG ABV 10 THSD BCMG IFR CIG TRWF . .

AMA 301010 C8 OVC 3R-F 0314 CHC C5 OVC 1TRW-F. 17Z C18 BKN 0418 CHC C8 OVC 1TRWF. 20Z C30 BKN 1417 CHC C10 OVC 1TRW + F. 04Z MVFR CIG . .

AUS 301010 C5 OVC 2F. 14Z C14 OVC 1510 CHC TRW. 20Z C20 OVC 1510 CHC C5 OVC 2TRW G25. 02Z C12 OVC 1010 CHC TRW. 04Z MVFR CIG TRW . .

BRO 301010 40 SCT C150 OVC 1210. 14Z C30 BKN 1512 CHC RW/TRW. 02Z C12 OVC 1010 CHC RW/TRW. 04Z MVFR CIG TRW . .

DAL 301010 80 SCT C250 4F VRBL C4 OVC 1F. 16Z C18 BKN 0512 SLGT CHC C12 OVC 2TRWF. 19Z 30 SCT C 80 BKN 0612 SCT CHC C10 OVC 1TRWF. 04Z VFR . .

FIGURE 5.—Terminal Forecasts.

AREA FORECAST EXCERPT

DFWC FA 231040

SGFNT CLOUD AND WX VALID UNTIL 232300...OTLK 232300-240500

IFR...OK TX AR LA TN MS AL

FROM YDR TO YQT TO YYZ TO FWA TO CHA TO 60SE MSY TO LCH TO TXK
TO LBB TO SLN TO ISN TO YDR

OCNL CIGS BLO 10 OVC AND VSBYS BLO 3SF NRN AND WRN PTN AND RF
ELSW. CONDS SLOLY DMSHG FROM SW BUT CONTG BYD 23Z.

OK

CIGS 10-15 OVC LYRD TO 120. OCNL CIGS BLO 10 OVC AND VSBYS BLO
3R-S-F. 19Z CIGS 20 BKN-OVC 80 BKN 120. 22Z AGL 20-30 SCT-BKN 60.
OTLK...VFR.

NWRN TX

CIGS 20-30 BKN 80. OCNL CIGS BLO 10 TIL 16Z ERN PMHDL.
18Z AGL 30-50 SCT. OTLK...VFR.

SWRN TX

NO CIG BLO 120. OTLK...VFR.

NCNTRL AND NERN TX

AGL 15-20 SCT-BKN 50 BKN-OVC 120. ISOLD RW-. 18Z AGL 20-30 SCT
80 BKN 120. OTLK...VFR.

SCNTRL TX SERN TX AND CSTL WTRS

CSTL PLAIN SERN AND CSTL WTRS..CIGS 15-20 BKN-OVC 40 OVC 15. SCT
TRW WITH CB TOPS 450 EXTRM SERN AND CSTL WTRS TIL 15Z. 16Z CIGS
30 BKN-SCT 80 BKN 120. OTLK...VFR.

RMNDR SCNTRL TX...CIGS 30-50 BKN 80 BKN 121. 16Z 80 BKN 120.
OTLK...VFR.

AR LA AND CSTL WTRS

CIGS 10-15 OVC LYJD TO 180. OCNL CIGS BLO 10 OVC AND VSBYS BLO
3R-F. SCT TRW WITH CB TOPS 450 SLOLY ENDG FROM W. 18Z CIGS 20 BKN
60 BKN-OVC 120. ISOLD TRW- WITH CB TOPS 350 SERN LA. 21Z AGL
30-50 SCT 80 BKN 120 LA AND CIGS 20-30 BKN-SCT 80 BKN 120 AR.
OTLK...VFR.

WRN TWO THIRDS TN MS AND CSTL WTRS

CIGS 10-15 OVC LYRD TO 150. OCNL CIGS BLO 10 OVC AND VSBYS BLO
3R-F. SCT TRW WITH CB TOPS 450. OTLK...MVFR CIG RW.

ERN THIRD IN

AGL 20 SCT 30-50 BKN-OVC LYRD TO 120. 15Z CIGS 20-30 BKN 50 OVC
LYRD TO 150. WDLY SCT TRW WITH CB TOPS 450. OTLK...MVFR CIG TRW.

AL

NWRN HALF...CIGS 10 OVC LYRD TO 150. WDWY SCT RW- WITH OCNL CIGS
BLO 10 OVC AND VSBYS BLO 3R-F TIL 17Z. WDLY SCT TRW WITH CB TOPS
450 AFT 13Z. OTLK...MVFR CIG TRW.

SERN HALF AND CSTL WTRS...CIGS 15-20 BKN-OVC LYRD TO 150 WITH
WDLY SCT RW- SWRN PIN. LCL CIGS BLO 10 OVC AND VSBYS BLO 3R-F TIL
16Z. WDLY SCT TRW- WITH CB TOPS 450 AFT 16Z. OTLK...MVFR CIG TRW.

FIGURE 6.—Area Forecast.

WINDS AND TEMPERATURES ALOFT FORECASTS

FDUS1 KWBC 301640
DATA BASED ON 301200Z

VALID 301800Z FOR USE 1700-2100Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
ABI		1409+11	1611+06	1609+01	1608-13	1815-25	192440	192550	191960
ABQ			1307+08	1608+01	2005-13	2508-26	271642	282151	292460
AMA		0408	0905+05	9900+00	2108-13	2214-25	232141	232351	232261
BRO	9900	2211+14	2314+09	2318+04	2428-10	2336-23	234739	235448	246358
DAL	1008	1506+11	1705+07	2006+01	2210-13	2217-24	222740	223049	232960
ICT	3514	3412+06	3210+03	2910-01	2618-13	2526-26	253542	254052	254463

FIGURE 7.—Winds and Temperatures Aloft Forecasts.

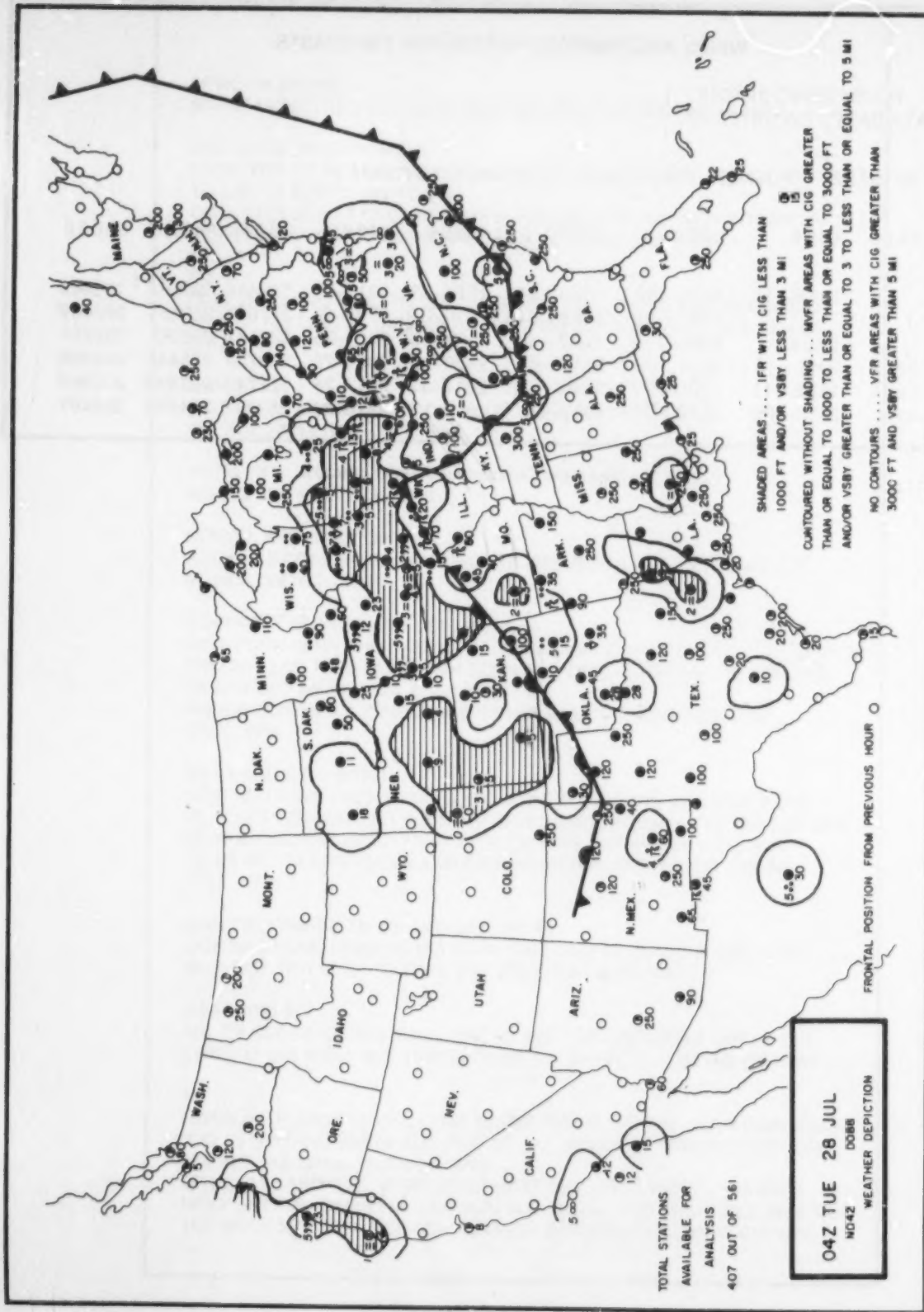


FIGURE 8.—Weather Depiction Chart.

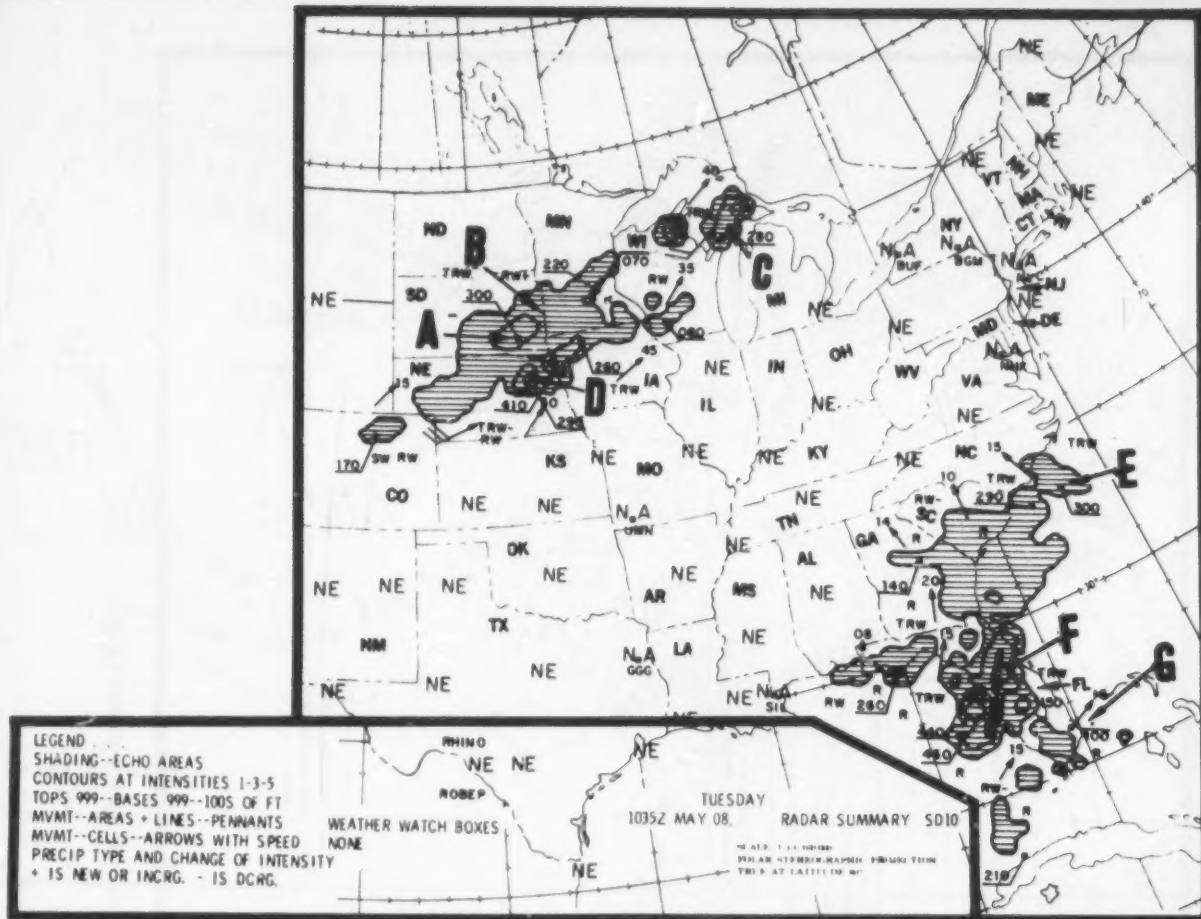


FIGURE 9.—Radar Summary Chart.

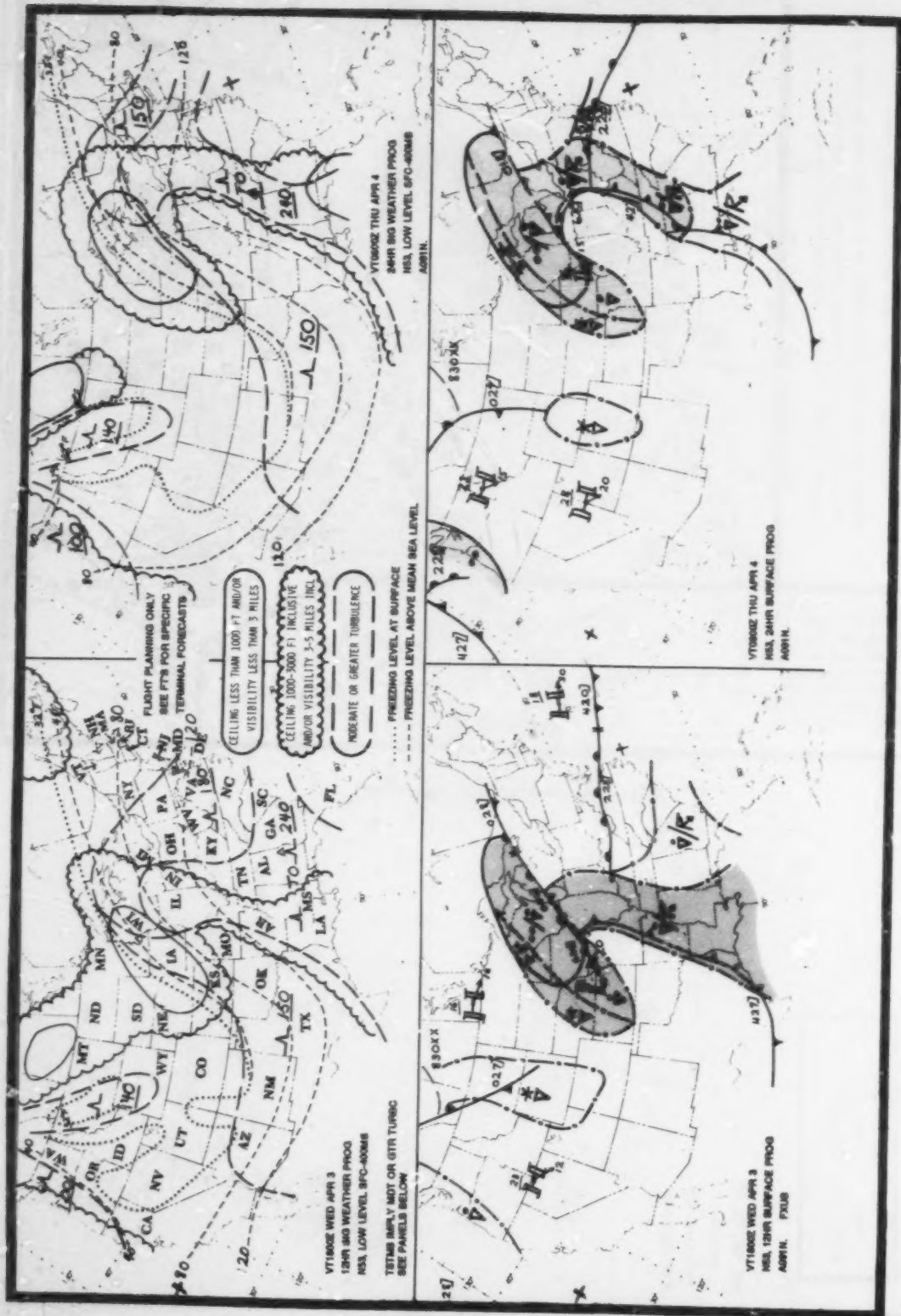


FIGURE 10.—Significant Prognostic Chart.

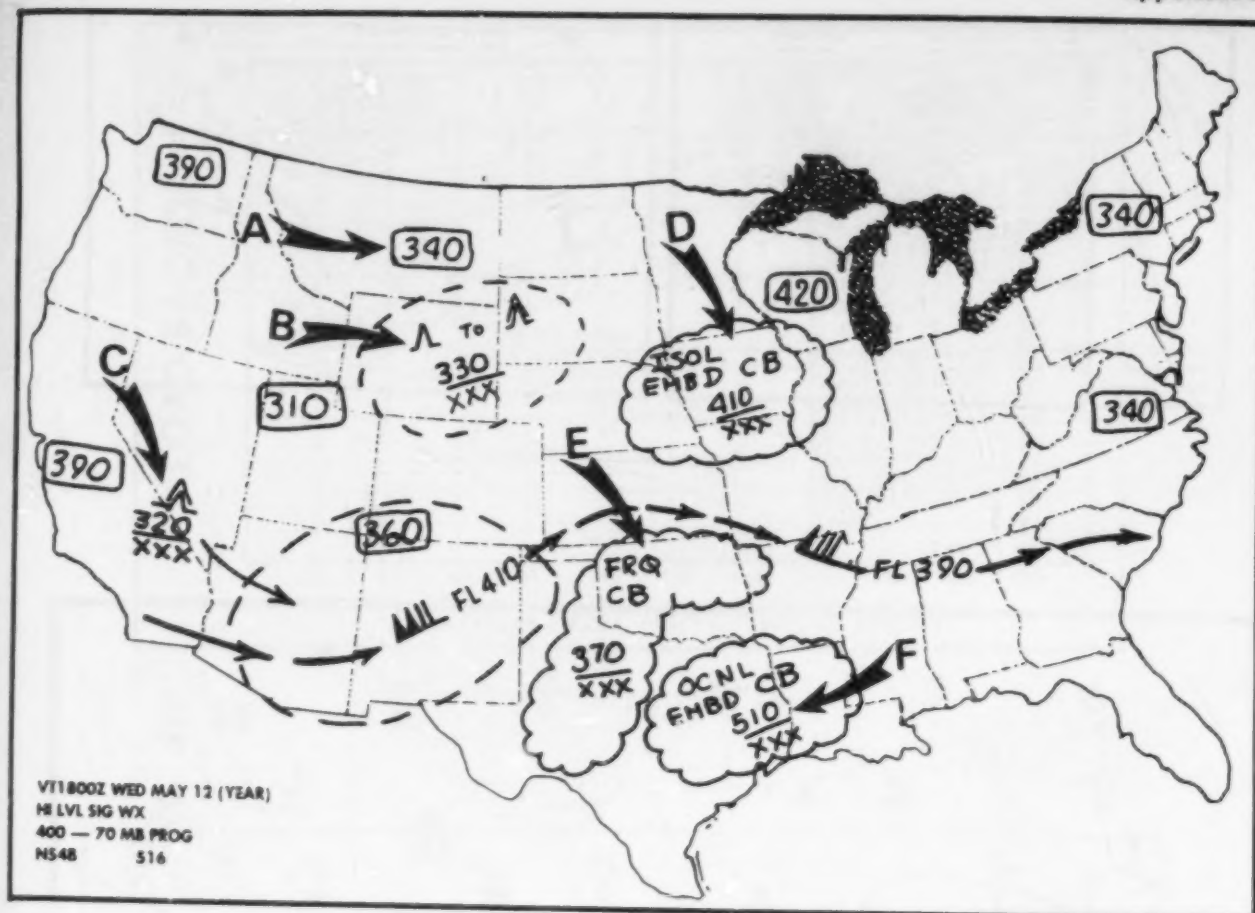


FIGURE 11.—High-Level Significant Prognostic Chart.

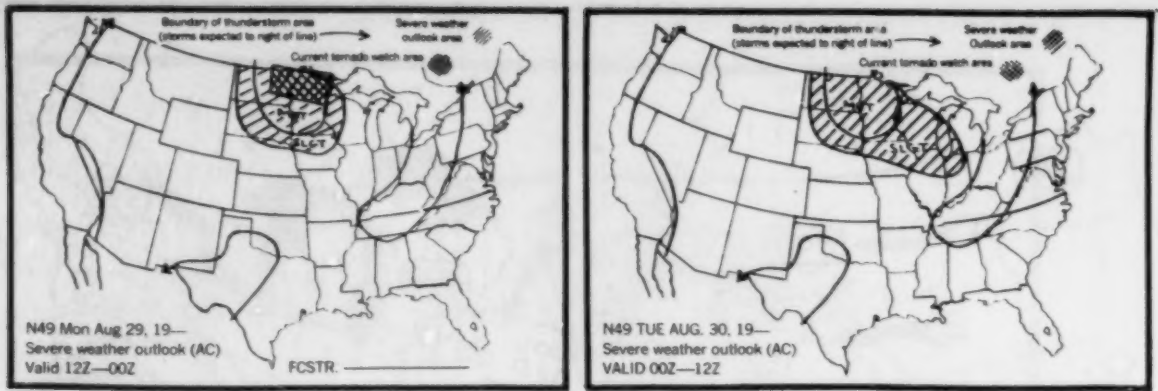


FIGURE 12.—Severe Weather Outlook Chart.



FIGURE 13.—Stability Chart.

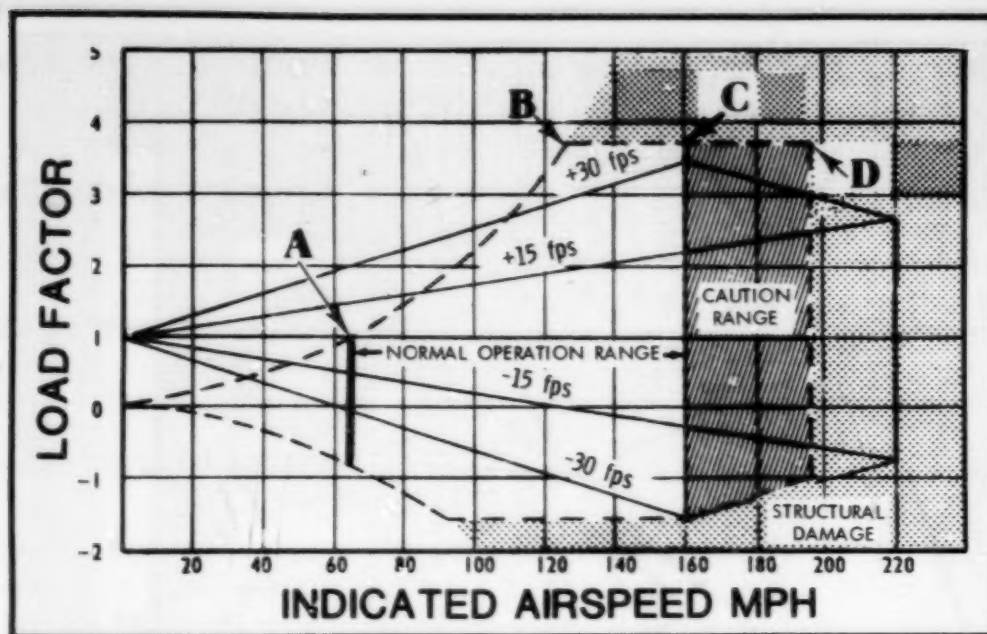


FIGURE 14.—Load Factor Chart.

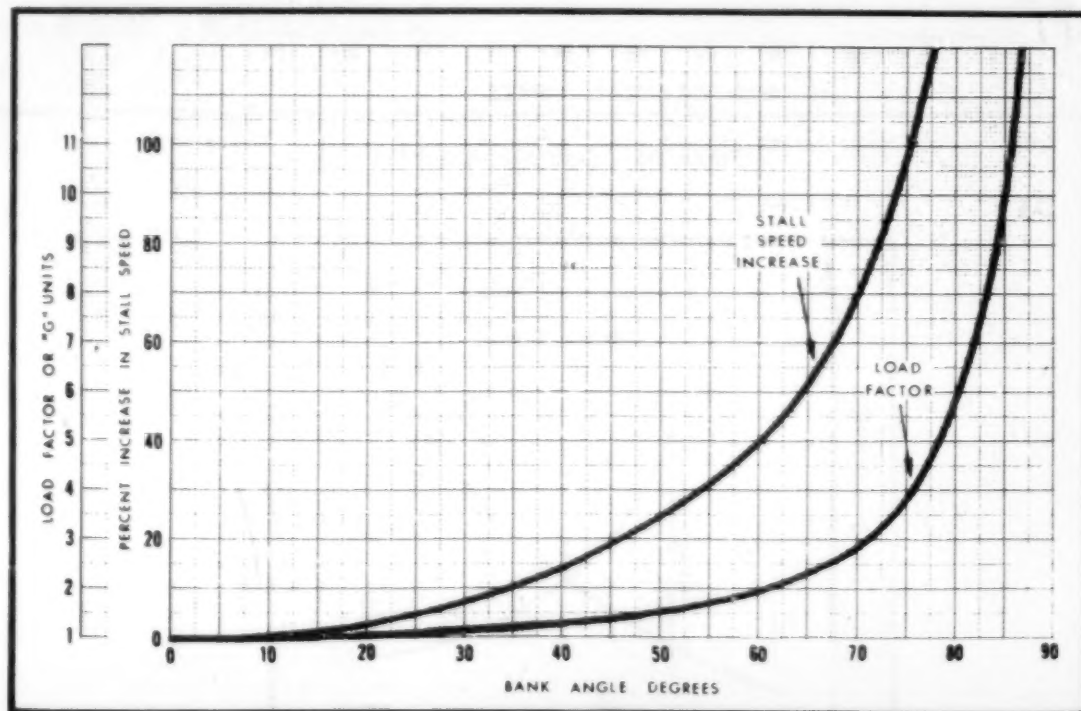


FIGURE 15.—Load Factor/Stall Speed Chart.

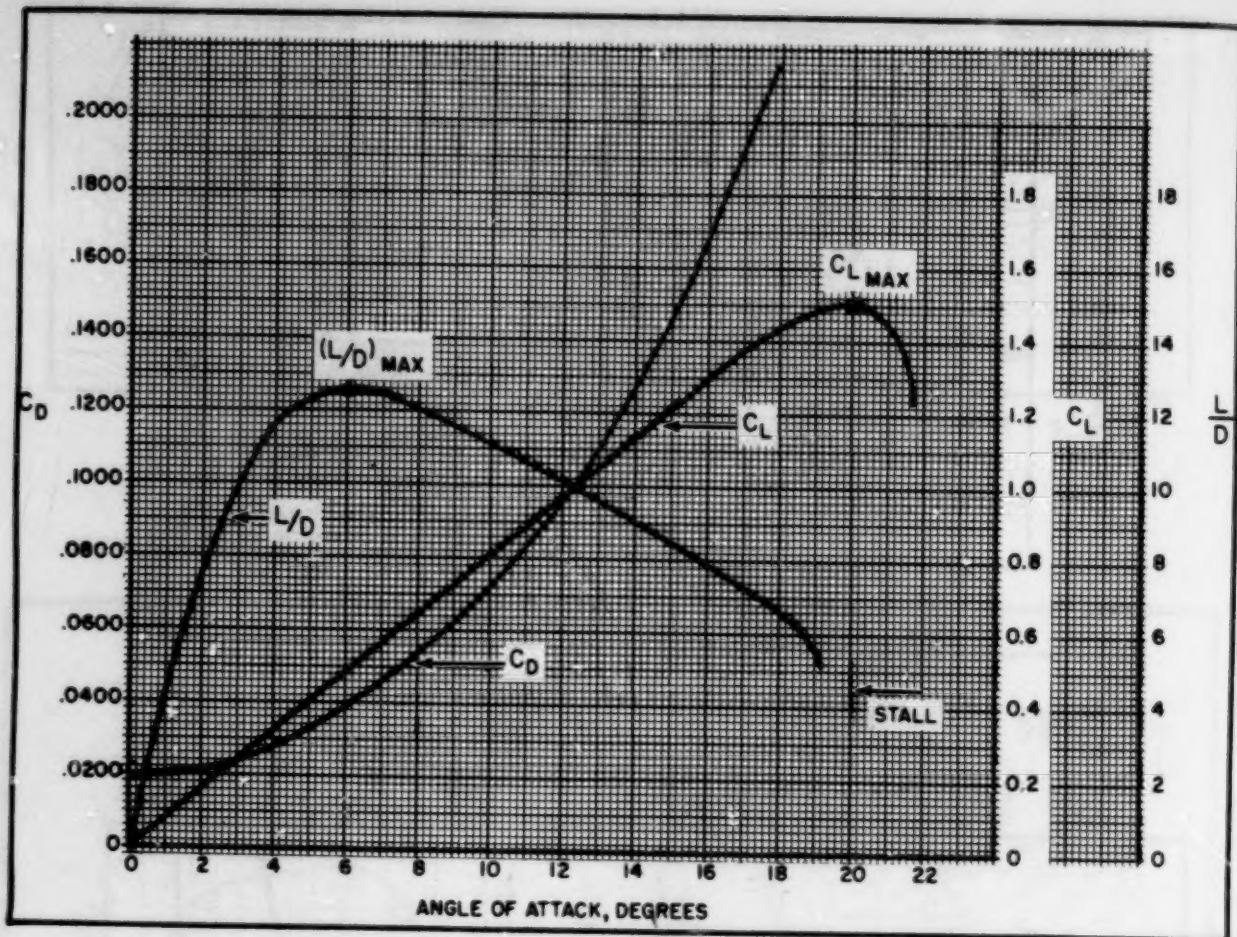


FIGURE 16.—Angle-of-Attack Chart.

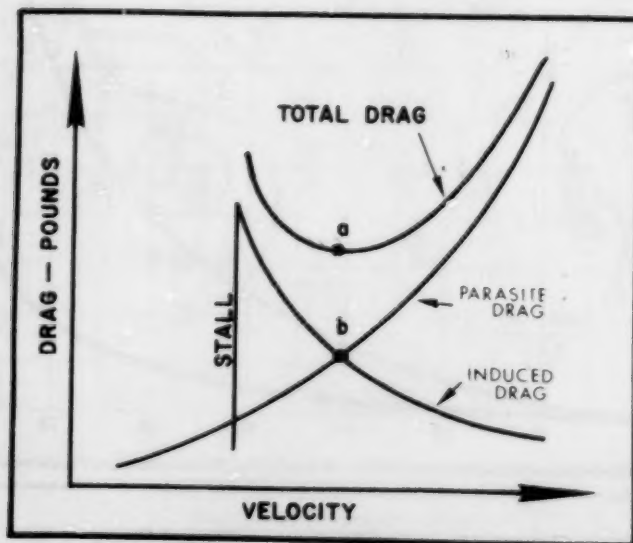
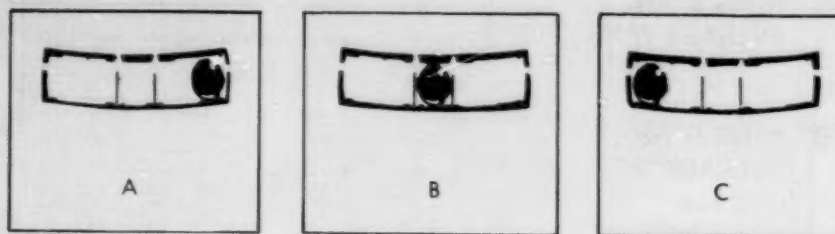


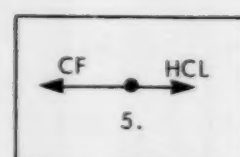
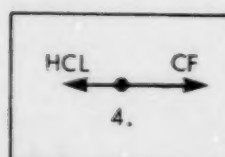
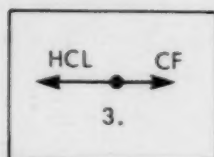
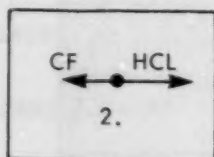
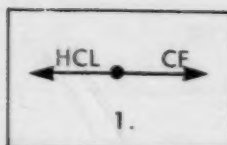
FIGURE 17.—Drag Chart.

AIRCRAFT "A" WING SPAN.....	48 FEET
AVERAGE WING CHORD.....	5 FEET
AIRCRAFT "B" WING SPAN.....	30 FEET
AVERAGE WING CHORD.....	8 FEET
AIRCRAFT "C" WING SPAN.....	40 FEET
AVERAGE WING CHORD.....	5 FEET
AIRCRAFT "D" WING SPAN.....	36 FEET
AVERAGE WING CHORD.....	6 FEET

FIGURE 18.—Aspect Ratio.



INCLINOMETER



FORCE VECTORS

NOTE: HCL DENOTES HORIZONTAL COMPONENT OF LIFT.
CF DENOTES CENTRIFUGAL FORCE.
LENGTH OF ARROWS DENOTES MAGNITUDE OF FORCE.

FIGURE 19.—Force Vectors.

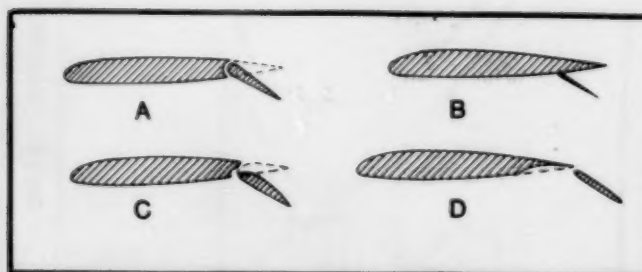
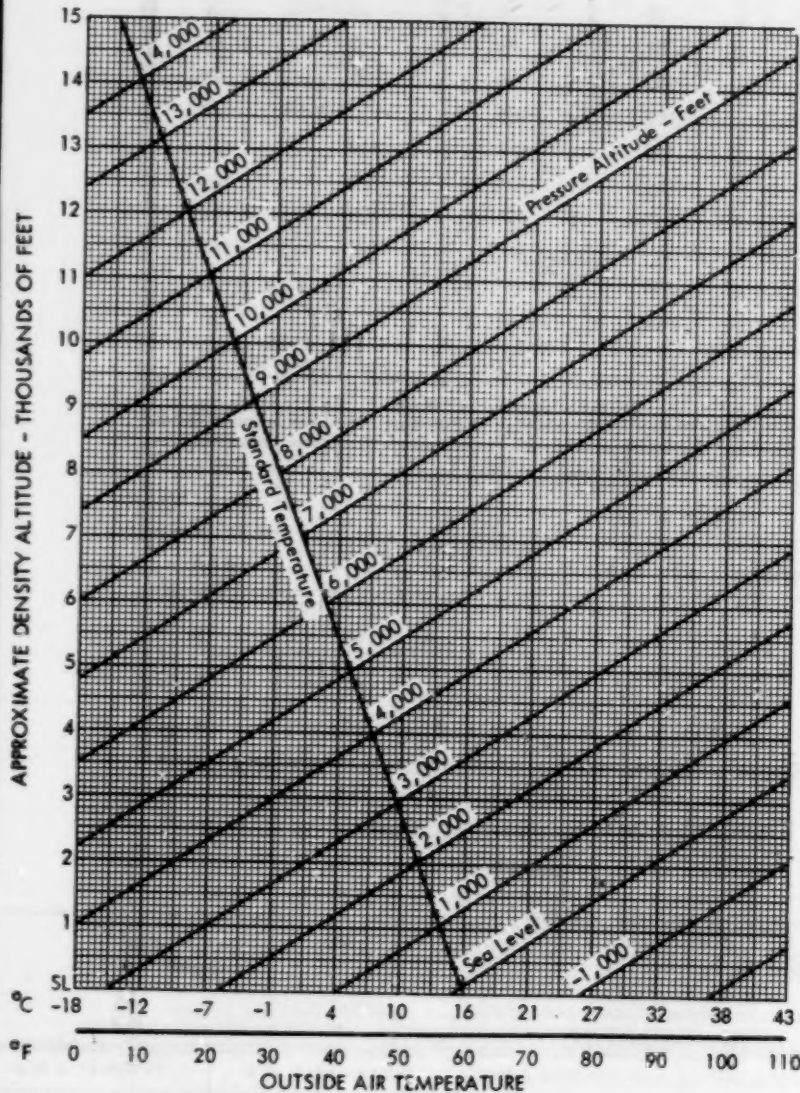


FIGURE 20.—Wing Flap Diagrams.

DENSITY ALTITUDE CHART



Altimeter
Setting
(In. Hg.)

Pressure
Altitude
Conversion
Factor

28.0	1,824
28.1	1,727
28.2	1,630
28.3	1,533
28.4	1,436
28.5	1,340
28.6	1,244
28.7	1,148
28.8	1,053
28.9	957
29.0	863
29.1	768
29.2	673
29.3	579
29.4	485
29.5	392
29.6	298
29.7	205
29.8	112
29.9	20
29.92	0
30.0	-73
30.1	-165
30.2	-257
30.3	-348
30.4	-440
30.5	-531
30.6	-622
30.7	-712
30.8	-803
30.9	-893
31.0	-983

FIGURE 21.—Density Altitude Chart.

AIRSPEED CORRECTION TABLE					
Flaps 0°		Flaps 15°*		Flaps 45°**	
IAS, MPH	CAS, MPH	IAS, MPH	CAS, MPH	IAS, MPH	CAS, MPH
80	84	70	79	70	76
100	102	80	86	80	84
120	122	90	94	90	93
140	141	100	103	100	102
160	161	110	112	110	111
180	181	120	121	120	120
200	201	130	131	130	129
220	221	140	141	140	138
240	242	150	151		
		160	161		
*Maximum Flap Speed 160 MPH			**Maximum Flap Speed 140 MPH		
NOTE: CAS IS IDENTICAL TO TIAS					

STALL SPEED CHART				
MPH-CAS				
4990 POUNDS GROSS WEIGHT				
CONFIGURATION	ANGLE OF BANK			
	0°	20°	40°	60°
Gear and Flaps Up	84	87	97	119
Gear Down and Flaps 15°	80	83	92	113
Gear Down and Flaps 45°	76	79	87	108

FIGURE 22.—Airspeed/Stall Speed Chart.

TAKE-OFF DATA										
TAKE-OFF DISTANCE WITH 20° FLAPS FROM HARD-SURFACED RUNWAY										
GROSS WEIGHT LBS.	IAS AT 50 FT. MPH	HEAD WIND MPH	AT SEA LEVEL & 59°F		AT 2500 FEET & 50°F		AT 5000 FT. & 41°F		AT 7500 FT. & 32°F	
			GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE
2200	55	0	345	680	405	770	480	885	580	1040
		15	208	460	245	525	295	615	365	725
		30	100	275	120	320	155	380	195	460
2600	60	0	500	915	585	1045	705	1230	855	1470
		15	310	635	370	735	455	870	560	1055
		30	165	395	200	465	255	565	325	695
3000	64	0	695	1210	820	1405	990	1675	1205	2045
		15	450	855	535	1005	660	1215	815	1505
		30	250	555	310	665	390	820	500	1030

NOTE: INCREASE DISTANCES 10% FOR EACH 25°F ABOVE STANDARD TEMPERATURE FOR PARTICULAR ALTITUDE.

FIGURE 23.—Takeoff Data Chart.

MAXIMUM CLIMB**CLIMB SPEED****ASSOCIATED CONDITIONS:**

POWER
WEIGHT
GEAR
FLAPS

MAXIMUM CONTINUOUS
3400 POUNDS
UP
UP

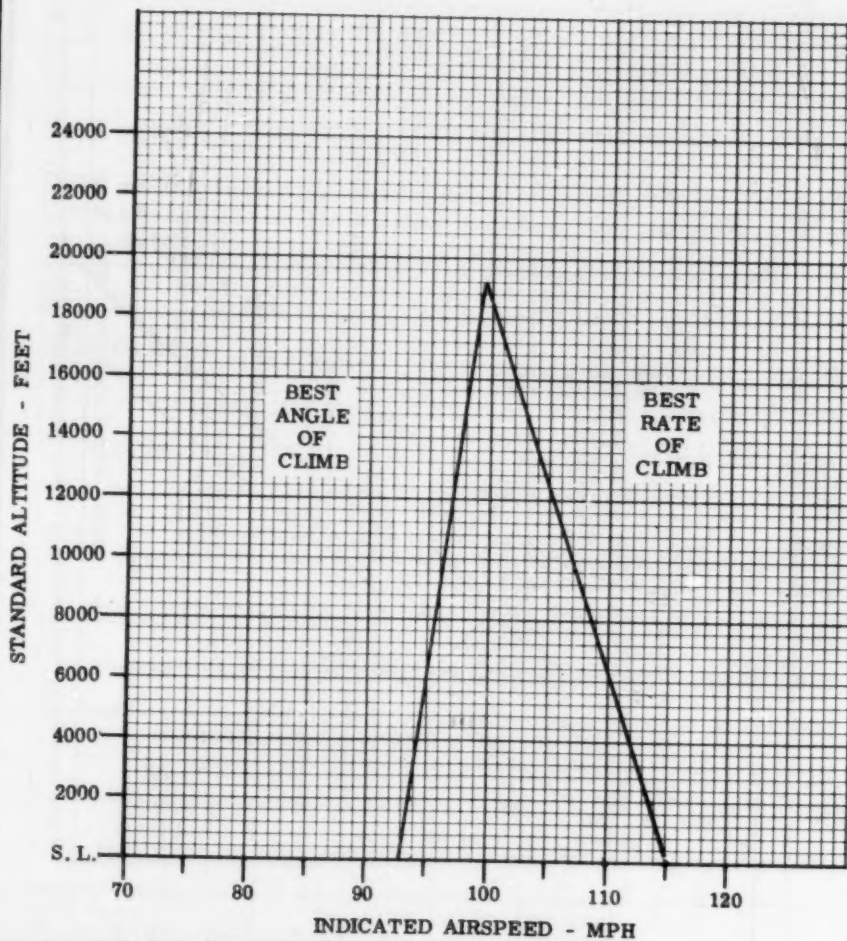


FIGURE 24.—Maximum Climb Chart.

FUEL CONSUMPTION VS BRAKE HORSEPOWER

NOTE:

TAKE-OFF AND CLIMB FUEL FLOW
PROVIDES ADDITIONAL COOLING IN
HIGH AMBIENT TEMPERATURES

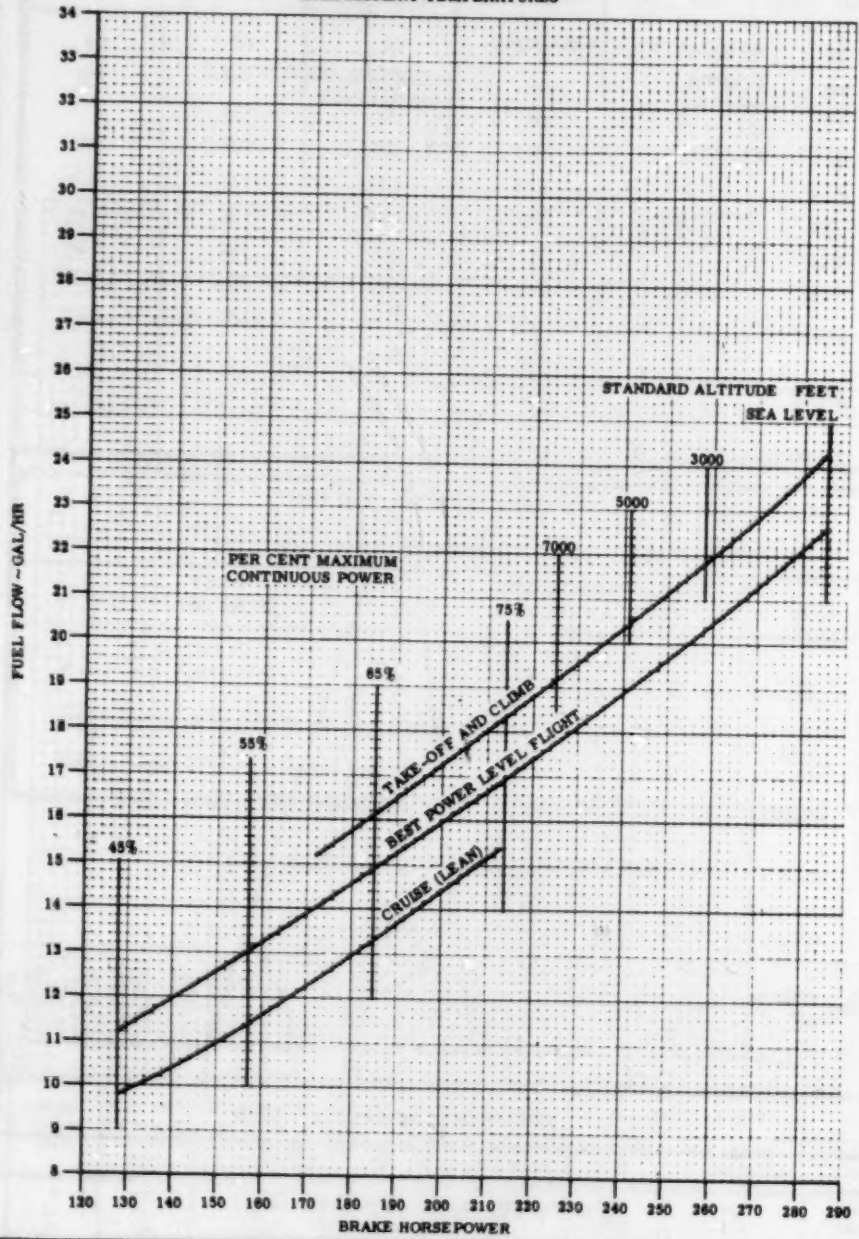


FIGURE 25.—Fuel Consumption vs. Brake Horsepower.

GLIDE DISTANCE

ASSOCIATED CONDITIONS:

GEAR	UP
FLAPS	UP
COWL FLAPS	CLOSED
PROPELLER	FULL HIGH PITCH (LOW RPM)
GLIDE SPEED	122 MPH IAS

- NOTES
1. INCREASE GLIDE DISTANCE APPROXIMATELY 10% FOR EACH 10 KNOTS OF TAILWIND.
 2. DECREASE GLIDE DISTANCE APPROXIMATELY 10% FOR EACH 10 KNOTS OF HEADWIND.

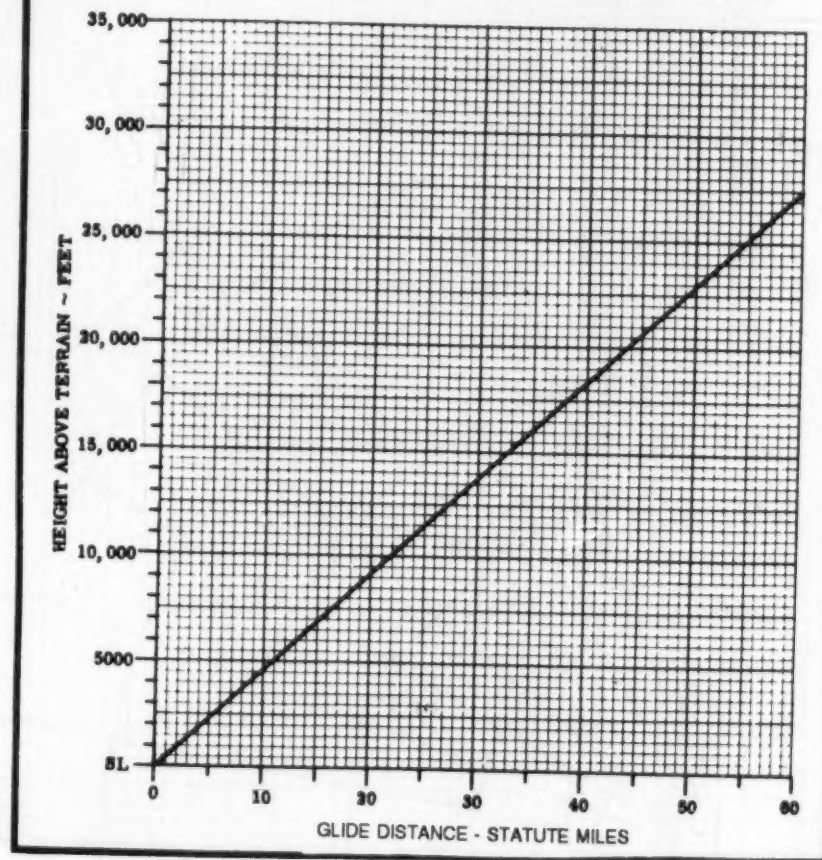


FIGURE 26.—Glide Distance.

WIND COMPONENTS

EXAMPLE:

WIND SPEED	10 KNOTS
ANGLE BETWEEN WIND DIRECTION AND FLIGHT PATH	20°
HEADWIND COMPONENT	9.5 KNOTS
CROSSWIND COMPONENT	3.5 KNOTS

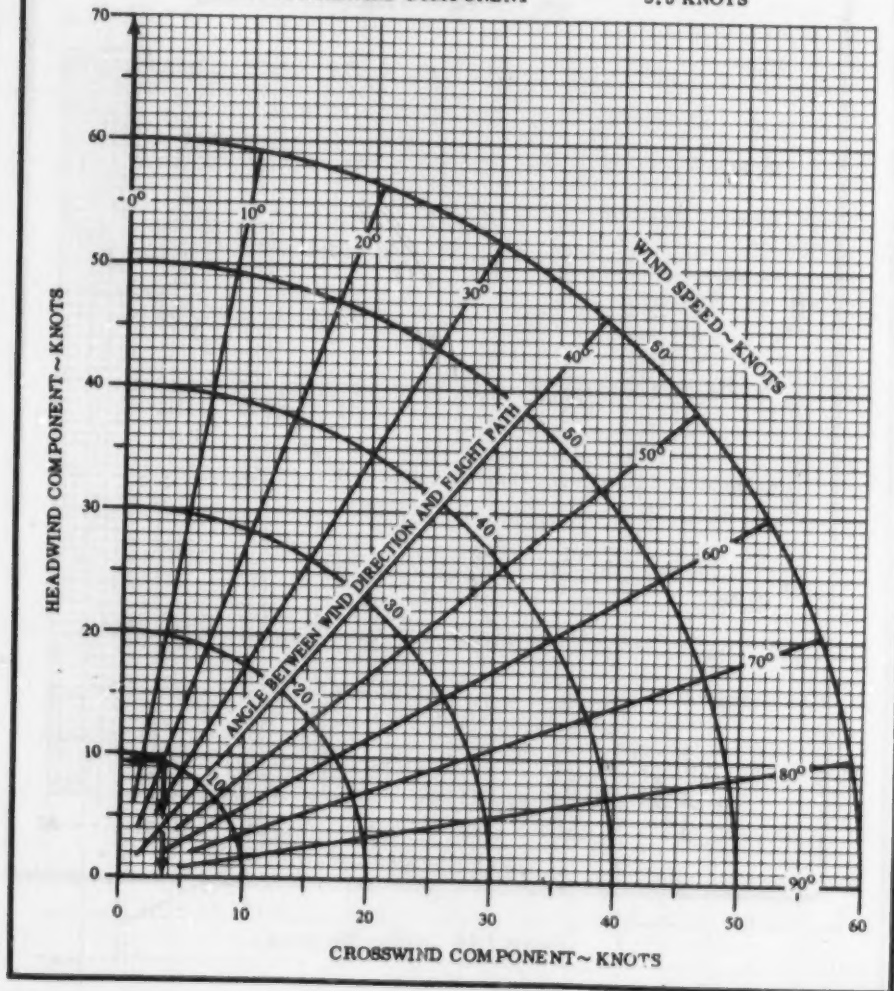


FIGURE 27.—Wind Component Chart.

NORMAL LANDING

ASSOCIATED CONDITIONS:

POWER AS REQUIRED TO
MAINTAIN 800 FT/MIN
DESCENT ON APPROACH
DOWN
FLAPS PAVED, LEVEL,
RUNWAY DRY SURFACE
APPROACH IAS AS TABULATED
SPEED

NOTE: GROUND ROLL IS APPROX. 53%
OF TOTAL LANDING DISTANCE
OVER A 50 FT OBSTACLE.

EXAMPLE:

OAT 75° F.
PRESSURE ALTITUDE 4000 FT
LANDING WEIGHT 3200 LBS
HEAD WIND 10 KNOTS
TOTAL LANDING DISTANCE
OVER A 50 FT OBSTACLE 1475 FT
GROUND ROLL (53% OF 1475) 782 FT
IAS APPROACH SPEED 87 MPH IAS

WEIGHT POUNDS	IAS APPROACH SPEED (ASSUMES ZERO INSTR. ERROR)	
	MPH	KNOTS
3400	90	78
3200	87	76
3000	84	73
2800	81	70
2600	78	68
2400	75	65

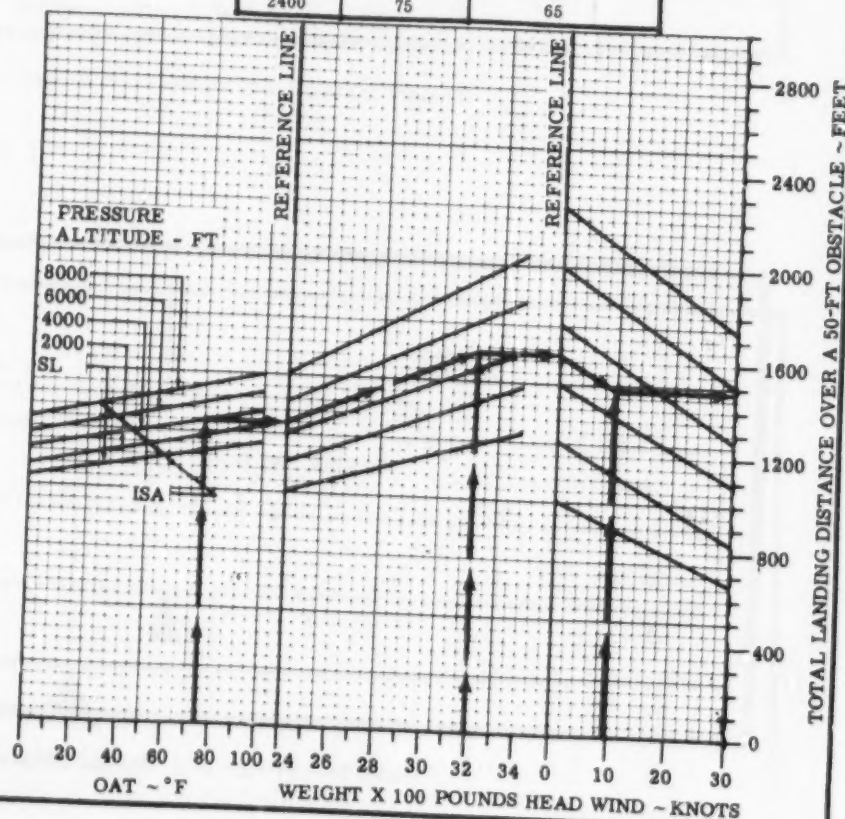


FIGURE 28.—Normal Landing Chart.

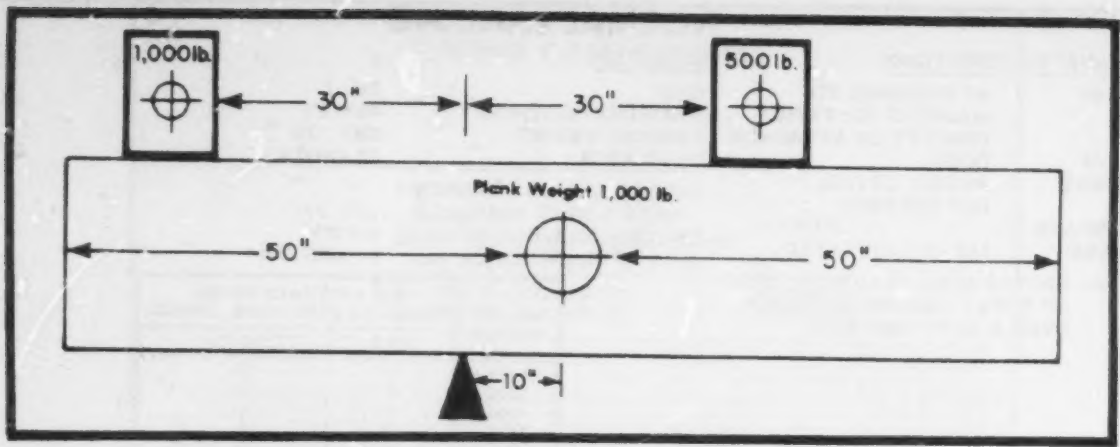


FIGURE 29.—Weight and Balance Diagram.

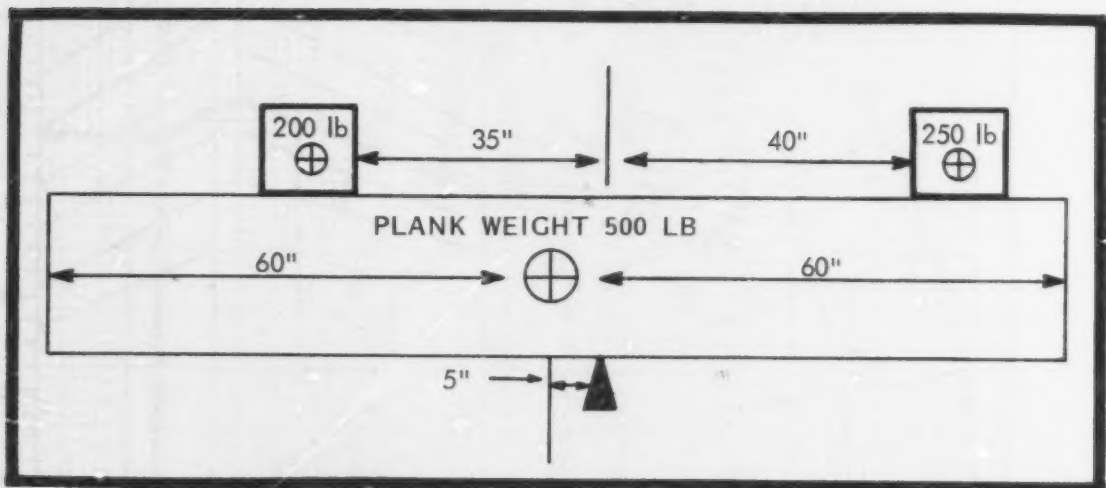


FIGURE 30.—Weight and Balance Diagram.

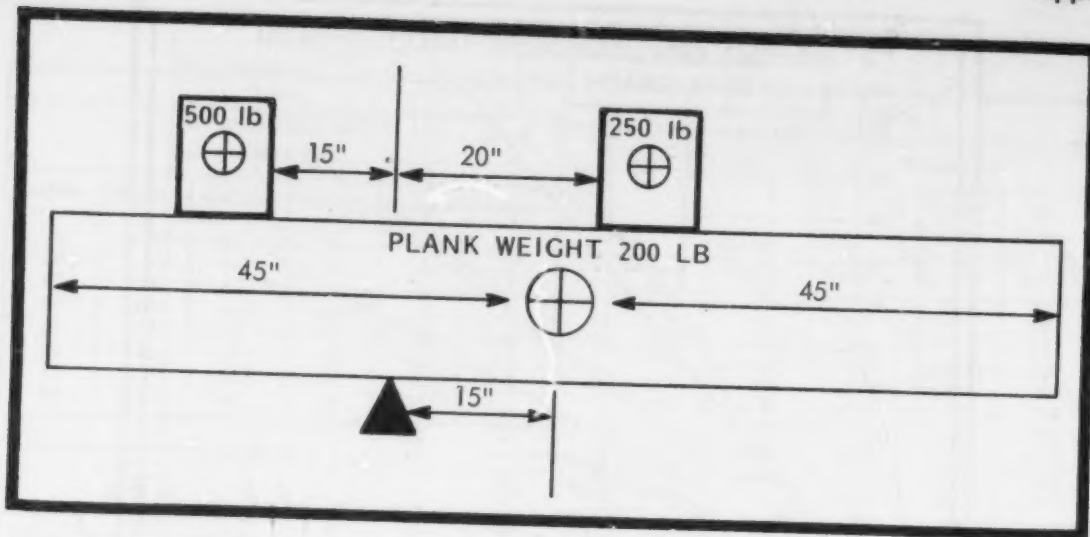


FIGURE 31.—Weight and Balance Diagram.

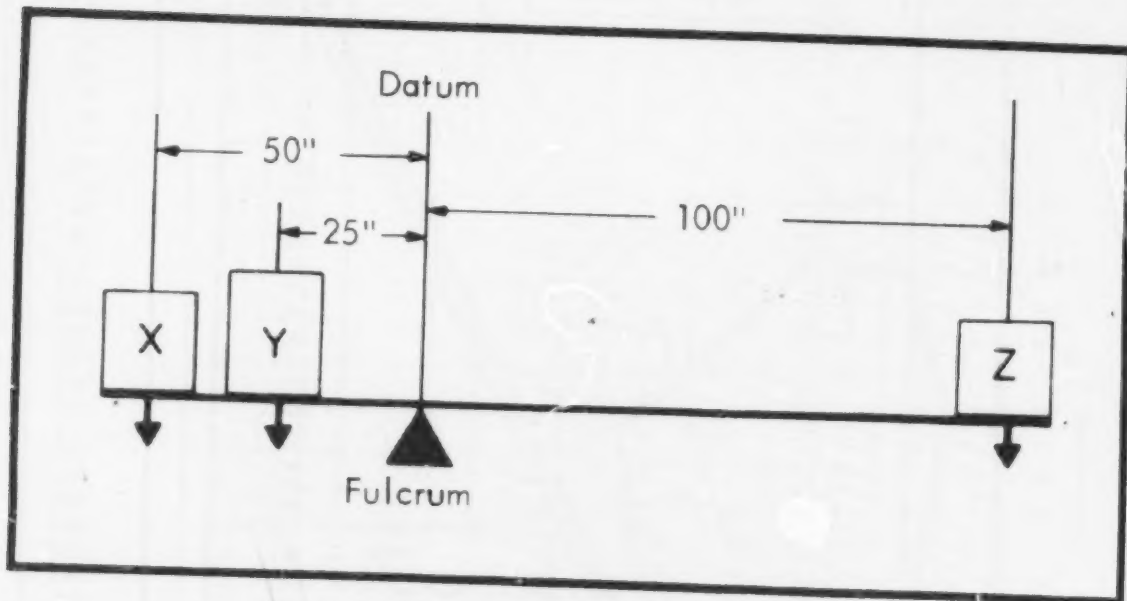


FIGURE 32.—Weight and Balance Diagram.

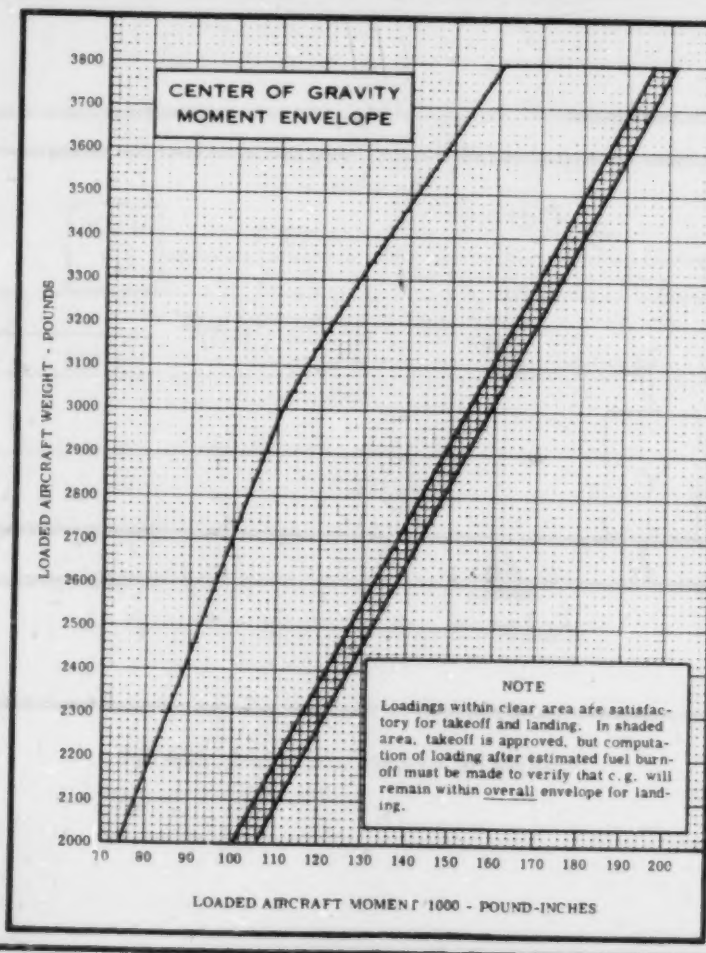
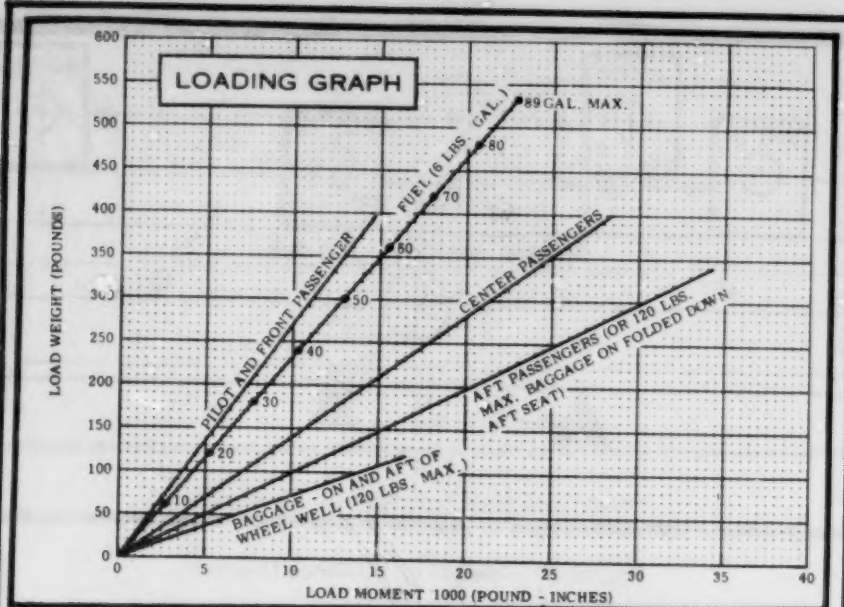


FIGURE 33.—Weight and Balance Chart.

USEFUL LOAD WEIGHTS AND MOMENTS

FUEL					
LEADING EDGE TANKS					
ARM 75					
Gallons	Weight	Moment	Gallons	Weight	Moment
5	30	23	45	270	203
10	60	45	49	294	221
15	90	68	55	330	248
20	120	90	60	360	270
25	150	113	65	390	293
30	180	135	70	420	315
35	210	158	75	450	338
40	240	180	80	480	360

OIL		
ARM 25		
Quarts	Weight	Moment
12	23	6

BAGGAGE	
ARM 150	
Weight	Moment
10	15
20	30
30	45
40	60
50	75
60	90
70	105
80	120
90	135
100	150
110	165
120	180
130	195
140	210
150	225
160	240
170	255
180	270
190	285
200	300
210	315
220	330
230	345
240	360
250	375
260	390
270	405

NOTE: All moments are equal to
 $\frac{\text{weight} \times \text{arm}}{100}$

OCCUPANTS				
Front Seats		Rear Seats		
		Fwd. Position		Aft Position
		ARM 121	ARM 136	
Weight	Moment	Weight	Moment	Moment
120	102	120	145	163
130	111	130	157	177
140	119	140	169	190
150	128	150	182	204
160	136	160	194	218
170	145	170	206	231
180	153	180	218	245
190	162	190	230	258
200	170	200	242	273

EMPTY WEIGHT DATA		
*Oil is included in empty weight	Empty Weight (Lbs.)	Empty Weight Moment (/100)
	Certificated Weight	2110
		1652

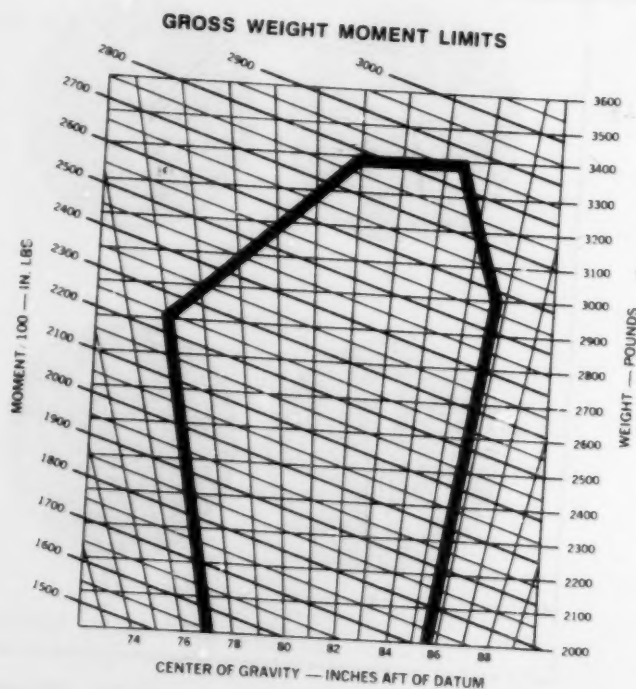
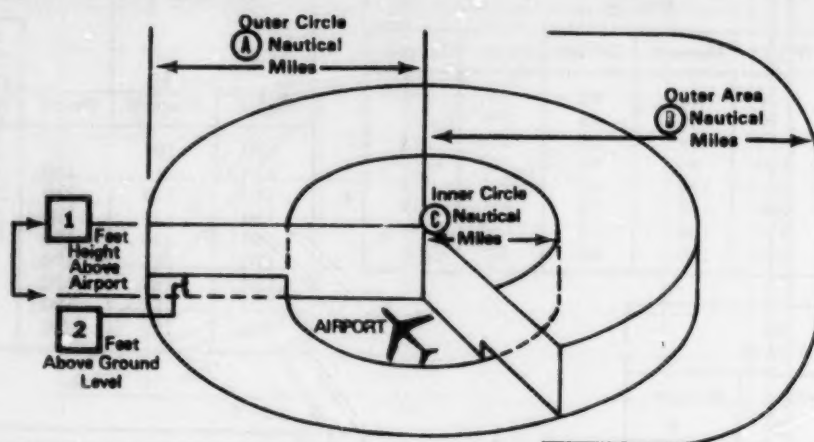


FIGURE 34.—Weight and Balance Chart.

Airport Radar Service Area (ARSA)



Services upon establishing two-way radio communication and radar contact:

Sequencing Arrivals

IFR/IFR Standard Separation

IFR/VFR Traffic Advisories and Conflict Resolution

VFR/VFR Traffic Advisories

IFR: Instrument Flight Rules
VFR: Visual Flight Rules

FIGURE 35.—Airport Radar Service Area Diagram.

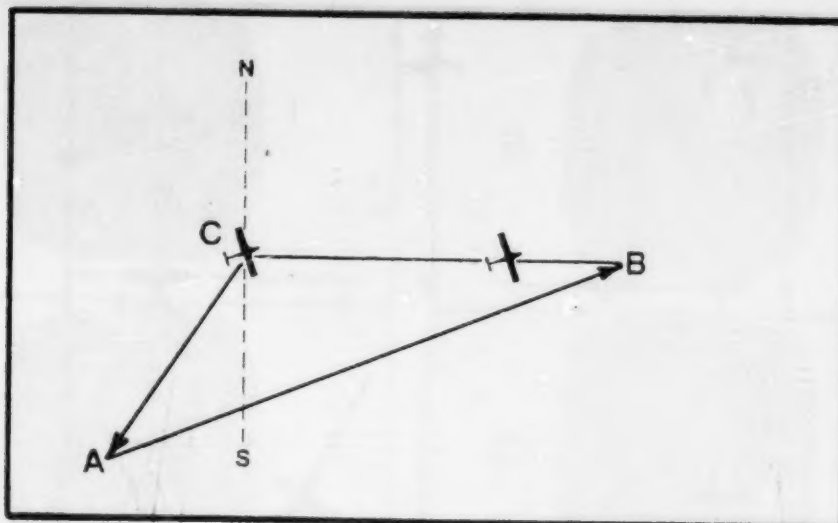


FIGURE 36.—Wind Triangle.

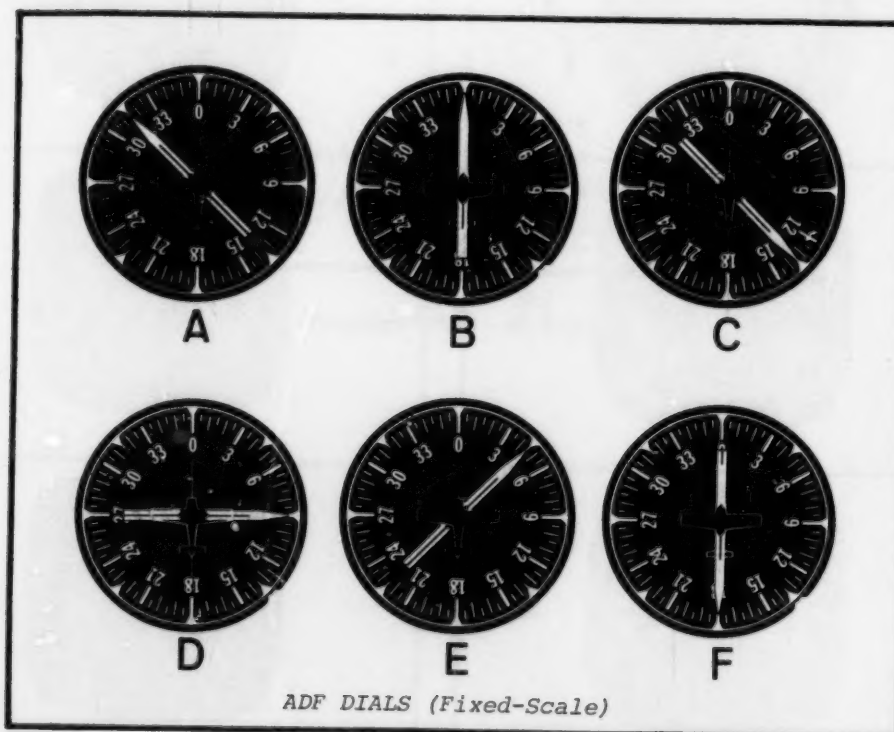


FIGURE 37.—ADF Indicators.

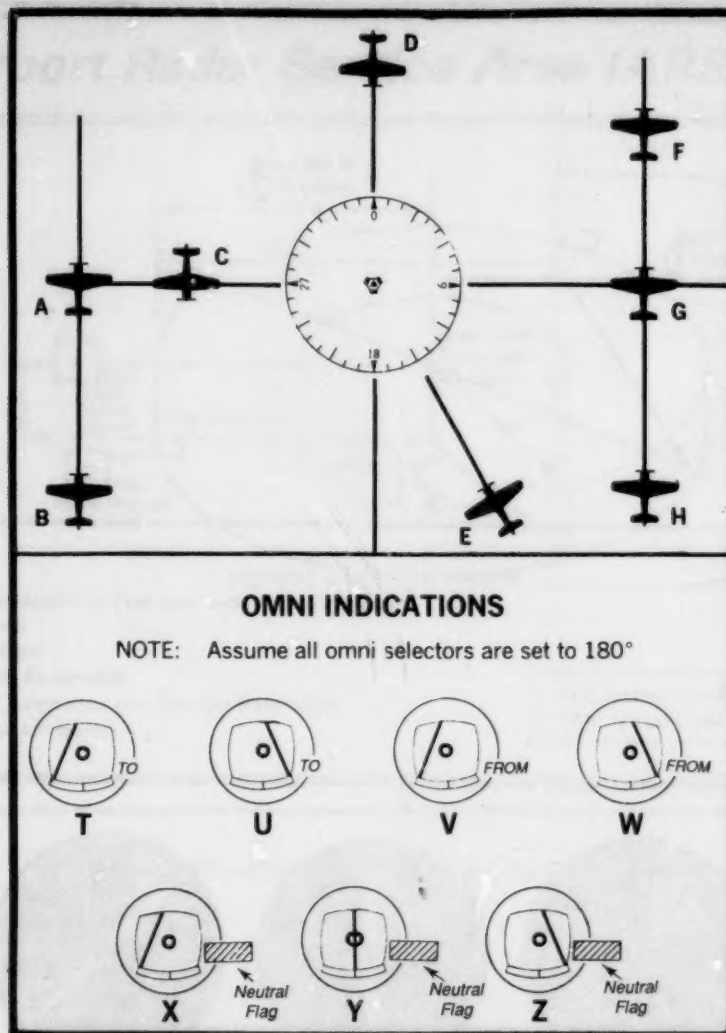


FIGURE 38.—OMNI Indicators.

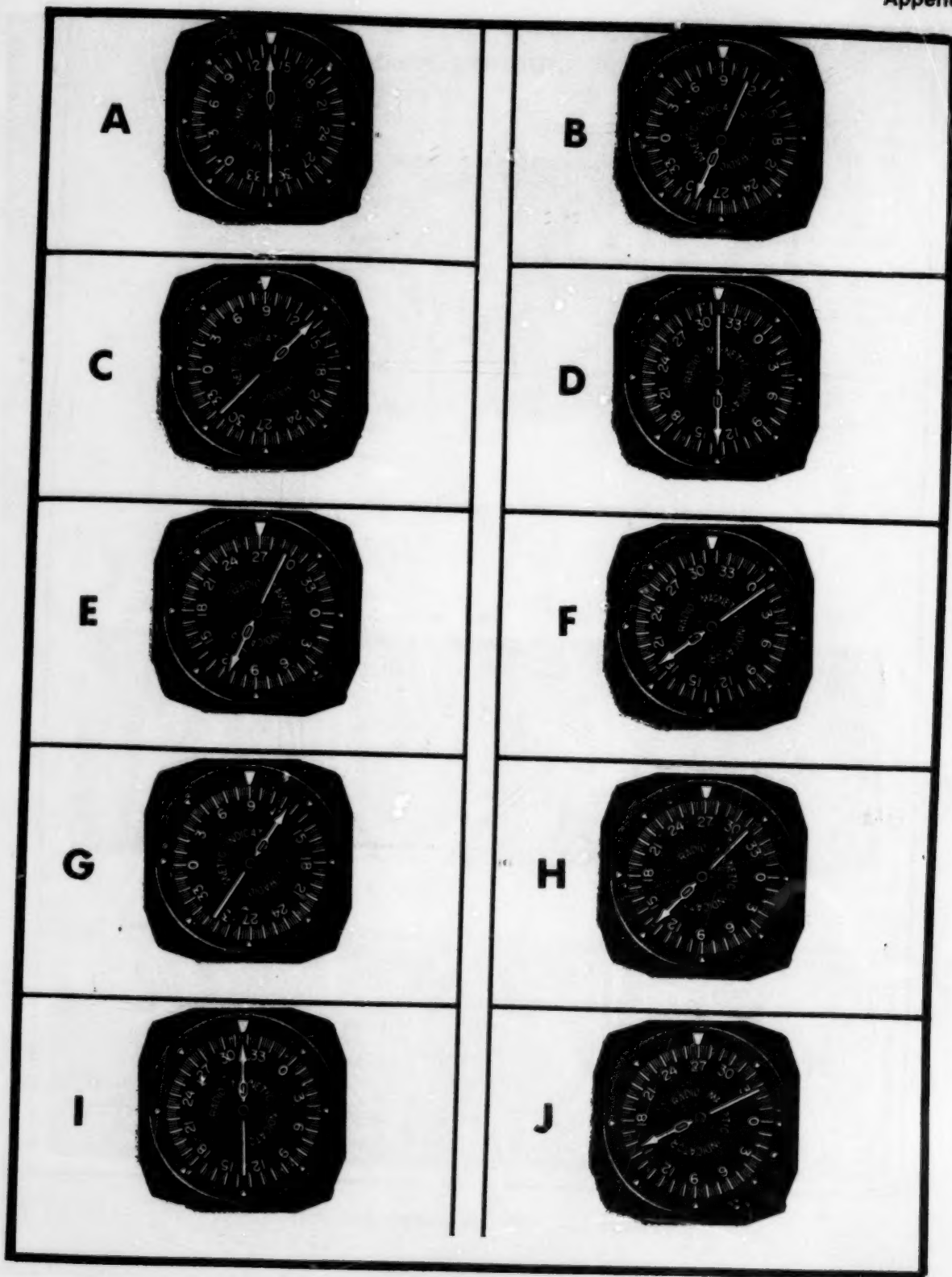


FIGURE 39.—RMI Indicators.

HORIZONTAL SITUATION INDICATOR (HSI)

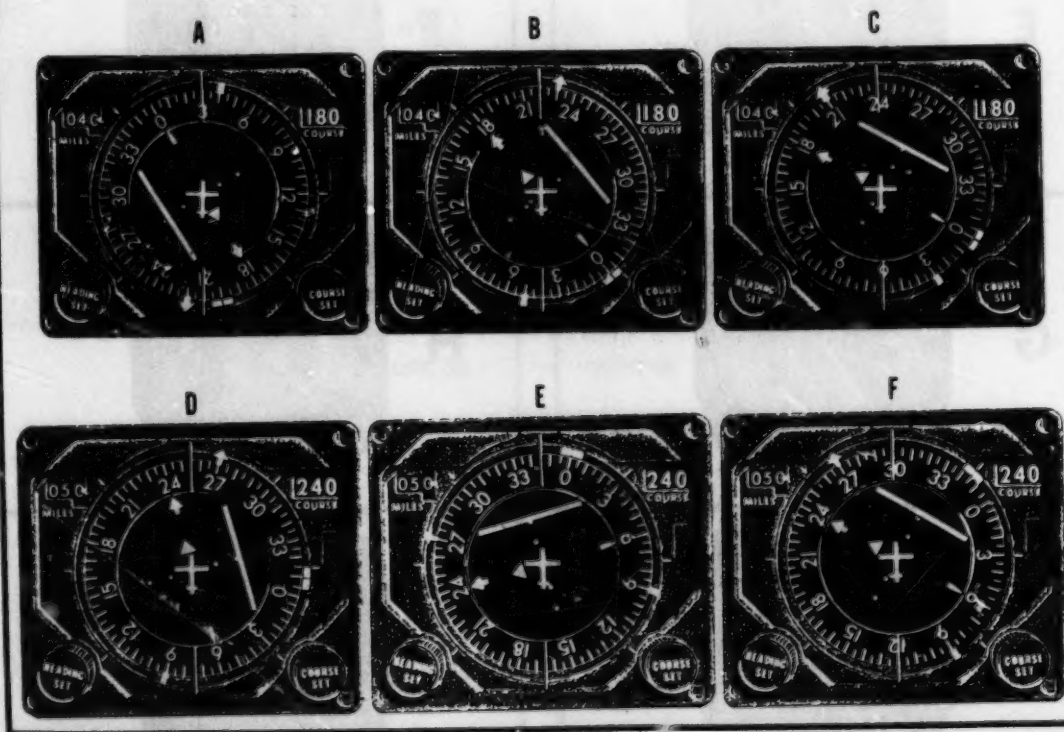
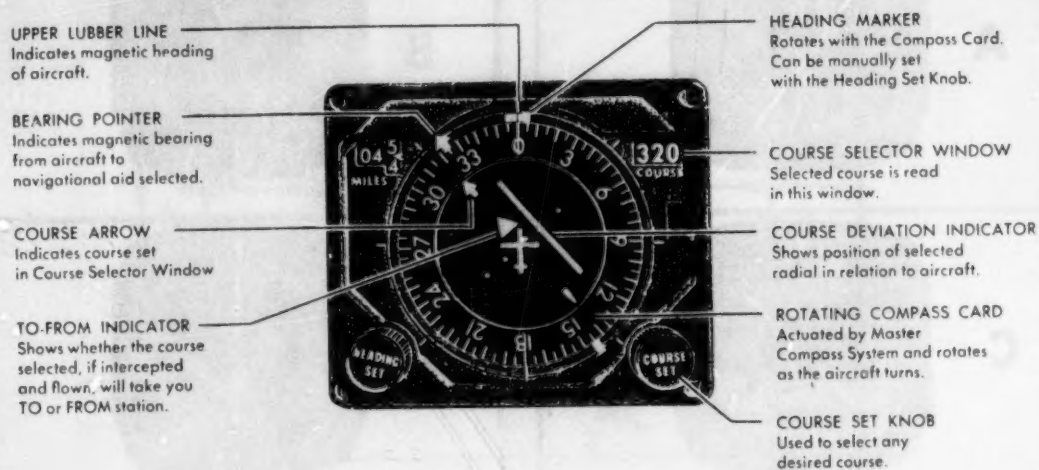


FIGURE 40.—Horizontal Situation Indicators.



FIGURE 43.—Sectional Chart.

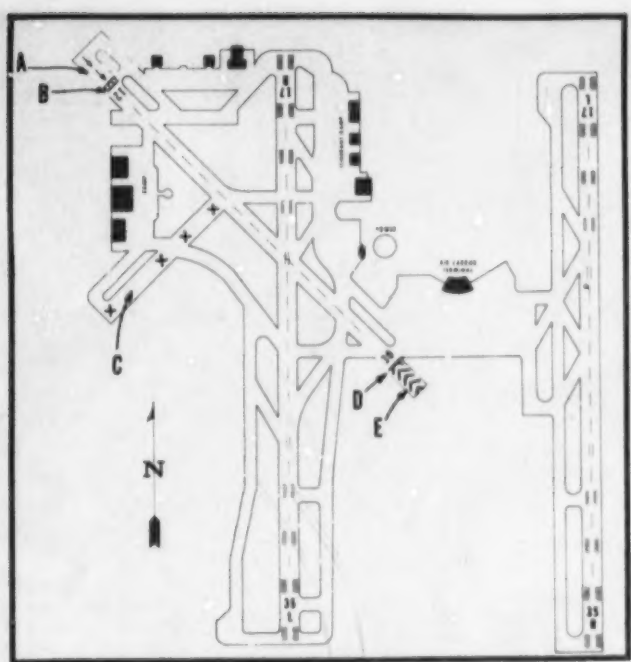


FIGURE 14.—Airport Diagram.

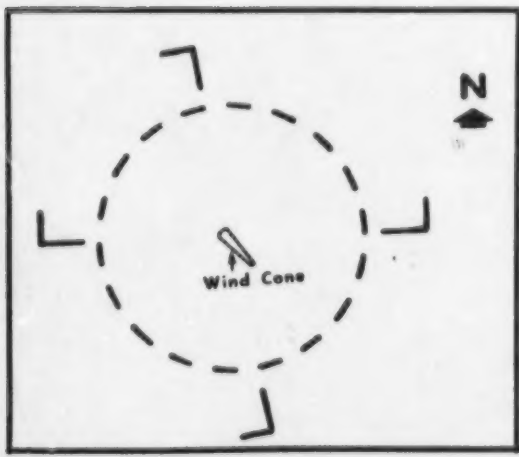


FIGURE 15.—Traffic Pattern Indicator.

TEXAS

TYLER

§ TYLER POUNDS FLD (TYR) 3 W UTC-6(-SDT) 32°21'15"N 95°24'08"W DALLAS-FT. WORTH
 544 B S4 FUEL 100LL, JET A OX 1, 3 CFR Index A H-2K, 4F, 5B, L-130, 17B
 RWY 13-31: H5201X150 (ASPH) S-40, D-60, DT-100 MIRL 0.5% up SE. IAP
 RWY 13: MALSR. Tree. RWY 31: ODALS. VASI(V4L)—GA 3.0" TCH 54'. Tree.
 RWY 04-22: H7199X150 (ASPH) S-40, D-60, DT-100 MIRL
 RWY 04: Tree. RWY 22: VASI(V4L)—GA 3.0" TCH 50'. Tree.
 RWY 17-35: H5065X150 (ASPH) S-40, D-60, DT-100 MIRL
 RWY 17: Thld displaced 216'. Tree. RWY 35: Tree.
 AIR/ORT REMARKS: Attended 1200-0300Z. For fuel after hours call 214-592-7395. ACTIVATE VASI Rwy 22 and Rwy 31, MALSR Rwy 13 and ODALS Rwy 31 ~120.1 when twr clsd. Control Zone effective 1230-0330Z.
 WEATHER DATA SOURCES: LAWRS (214) 997-8051.
 COMMUNICATIONS: CTAF 120.1 ATIS 126.25 (1230-0330Z) UNICOM 122.95
 FORT WORTH FSS (FTW) TF 1-800-WX-BRIEF. NOTAM FILE TYR
 TYLER RCO 122.3 (DALLAS FSS)
 TYLER APP/DEP CON 124.1 (1230-0330Z) FORT WORTH CENTER APP/DEP CON 135.25 (0330-1230Z)
 TOWER 120.1 (1230-0330Z) GND CON 121.9
 RADIO AIDS TO NAVIGATION: NOTAM FILE TYR.
 TYLER (T) VORW/DME 114.2 TYR Chan 89 32°21'21"N 95°24'12"W at fld. 540/06E.
 TYLER NDB (HW/LOW) 320 TY 32°24'57"N 95°28'09"W 129° 4.6 NM to fld
 ILS 109.9 I-TYR Rwy 13 LOM TYLER NDB Unmonitored when twr clsd.

TYLER

(T) VORW/DME 114.2 TYR Chan 89 32°21'21"N 95°24'12"W at Tyler Pounds Fld. DALLAS-FT. WORTH
 540/06E. NOTAM FILE TYR. L-130, 17B
 NDB (HW/LOW) 320 TY 32°24'57"N 95°28'09"W 129° 4.6 NM to Tyler Pounds Fld. NOTAM FILE TYR.
 RCO 122.3 (DALLAS FSS)

TYLER CO (See WOODVILLE)

TYLER POUNDS FLD (See TYLER)

UNCERTAIN

FLY-N-FISH LODGE (94T) 9NW UTC-6(-SDT) 32°42'46"N 94°07'29"W MEMPHIS
 195
 RWY 13-31: 4000X40 (DIRT)
 RWY 13: Trees. RWY 31: Trees.
 AIRPORT REMARKS: Unattended. Provided kg thids are displaced a sufficient distance to provide an apch clearance 20.1
 over any obstructions in the apch areas. +60' trees 80' left and 90' right obstruct the apch and transition surface
 on rwy 13. +30' trees 80' right and 50' left obstruct the apch and transition surface on Rwy 31.
 COMMUNICATIONS: CTAF 122.9
 FORT WORTH FSS (FTW) TF 1-800-WX-BRIEF

UPTON CO (See MCCAMEY)

UVALDE

§ GARNER FLD (UVA) 3 E UTC-6(-SDT) 29°12'39"N 99°44'35"W SAN ANTONIO
 941 B S4 FUEL 100LL, JET A OX 3, 4 H-9B, L-15C, 16E
 RWY 15-33: H5250X100 (ASPH) S-30, D-40, DT-40 MIRL IAP
 RWY 15: REIL. VASI(V2L)—GA 4.0" TCH 46'. Trees. RWY 33: REIL. VASI(V2L)—GA 3.0" TCH 28.8'.
 AIRPORT REMARKS: Attended daylight hours. Turf strip 3300'X75' parallel to and E of Rwy 15-33 used by crop dusters
 only. ACTIVATE MIRL Rwy 15-33—CTAF.
 COMMUNICATIONS: CTAF/UNICOM 122.8
 SAN ANGELO FSS (SJT) TF 1-800-WX-BRIEF. NOTAM FILE SJT.
 UVALDE RCO 123.65 (SAN ANGELO FSS)
 (H) HOUSTON CENTER APP/DEP CON 134.95
 RADIO AIDS TO NAVIGATION: NOTAM FILE SJT. VHF/DF ctc FSS.
 CENTER POINT (H) VORTAC 117.5 CSI Chan 122 29°55'20"N 99°12'50"W 205° 50.9 NM to fld.
 2070/06E.
 UVALDE NDB (MHW) 281 UVA 29°10'40"N 99°43'31"W 327° 1.8 NM to fld.

FIGURE 46.—Airport/Facility Directory.

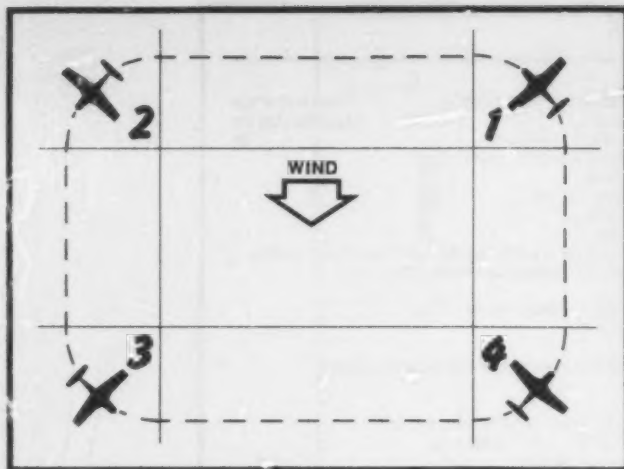


FIGURE 47.—Rectangular Course.

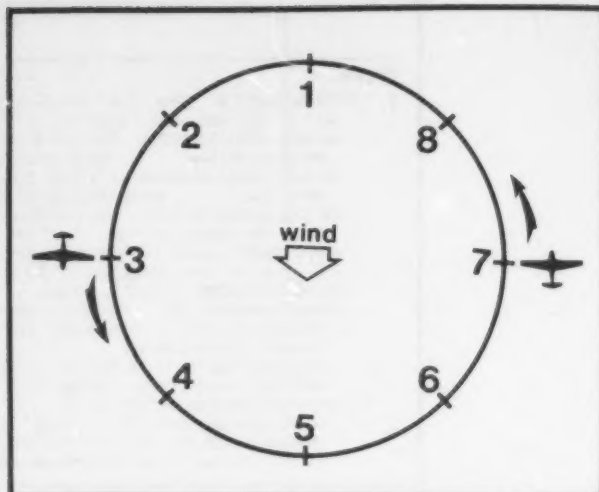


FIGURE 49.—Ground Track Diagram.

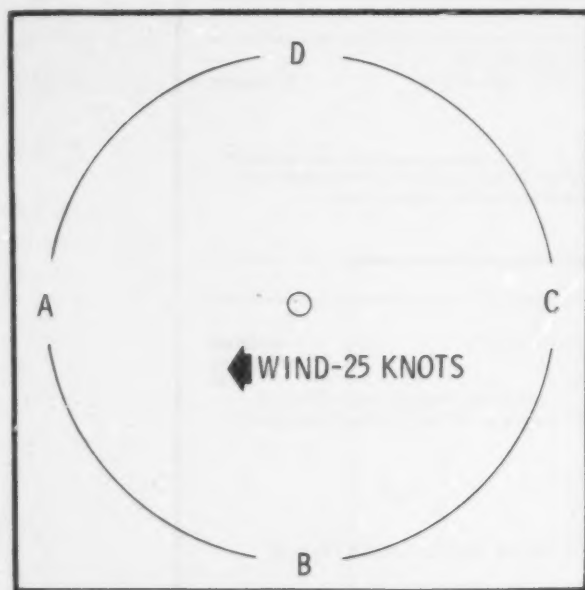


FIGURE 48.—Turn Around a Point Diagram.

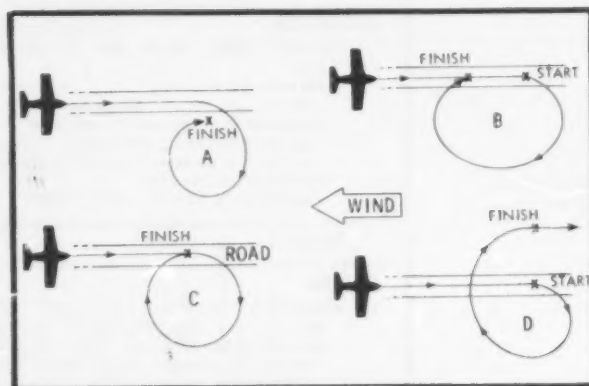


FIGURE 50.—Ground Track Diagram.

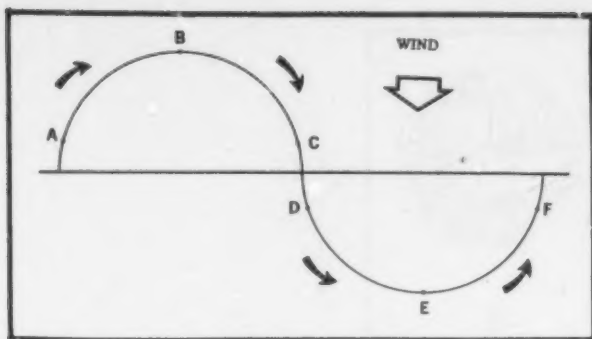


FIGURE 51.—S-Turn Diagram.

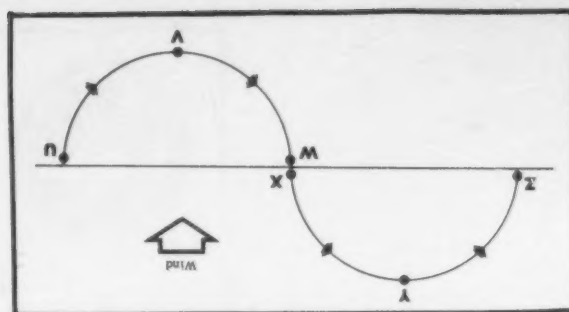


FIGURE 52.—S-Turn Diagram.

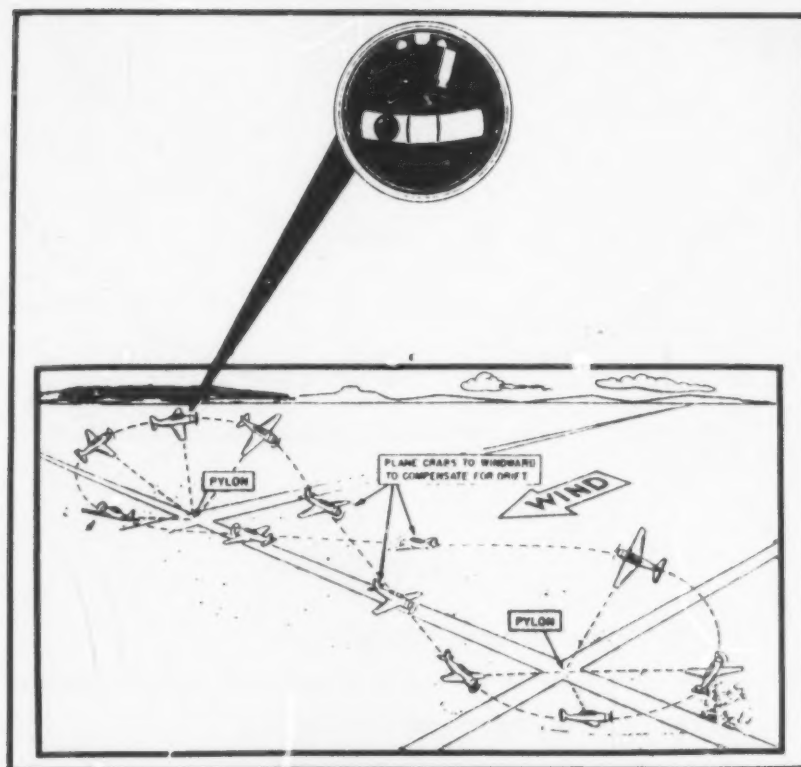


FIGURE 53.—Eights-On Pylon Diagram.

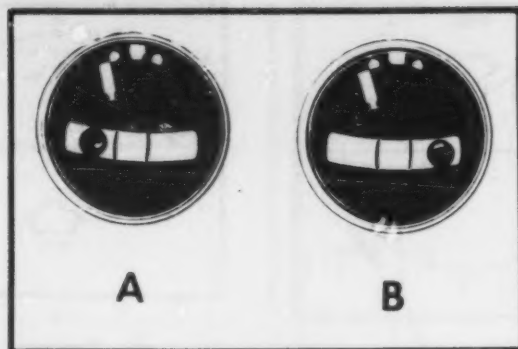


FIGURE 54.—Turn-and-Slip Indicator.

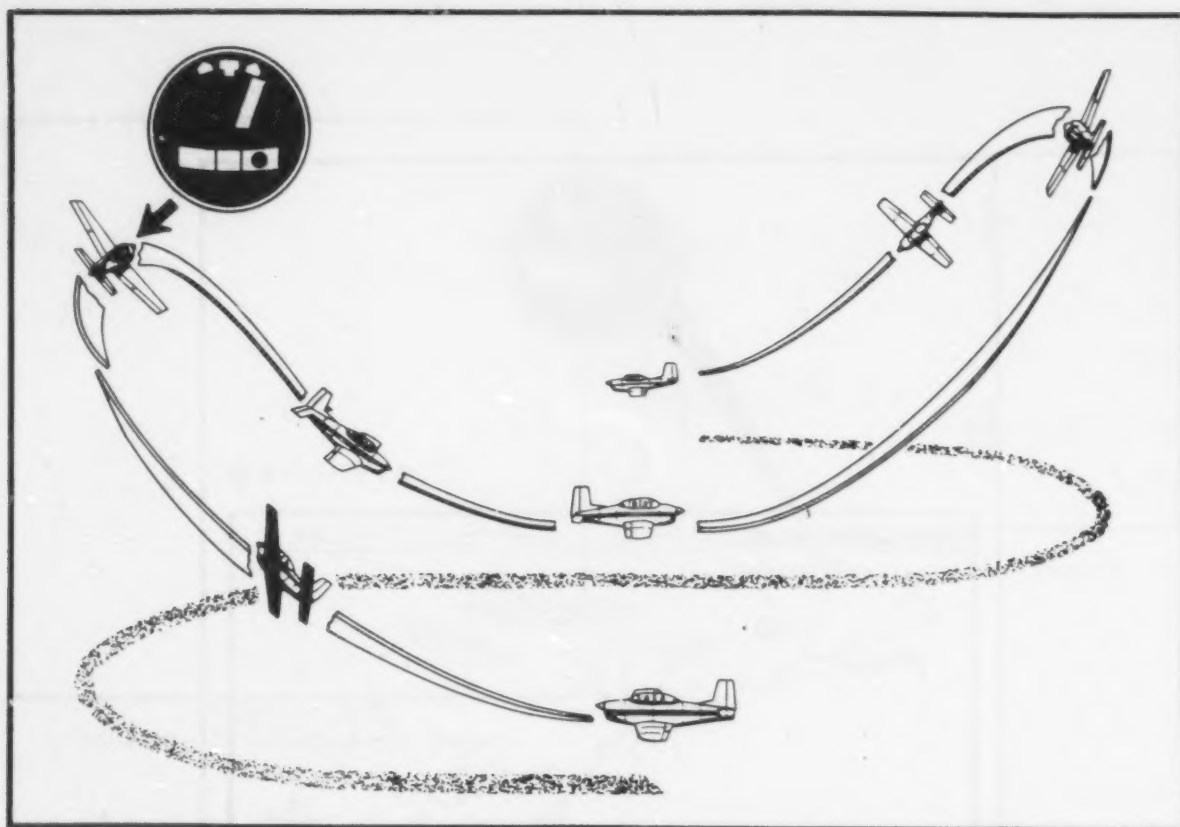


FIGURE 55.—Lazy Eight Diagram.